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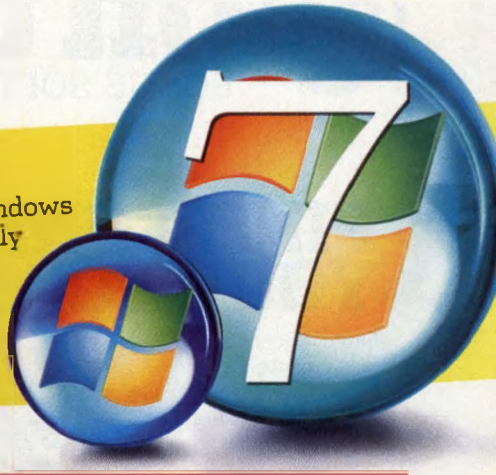

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06 editorial

TONY SARNO

THE CLOUD IS TURNING BLACK AND OMINOUS FOR TRADITIONAL DESKTOP COMPUTING

I was intrigued to see that Google has announced it will enable desktop storage of emails from Gmail. Add its Gdrive (massive online storage for users, due anytime) and it's effectively creating a free and highly effective alternative to desktop-based products for consumers and small businesses. In the meantime, Microsoft is accelerating its Microsoft Online Services, with Exchange/Outlook, SharePoint, Office Communications Server and Live Meeting at just US$15 per month per user. In other words, both at the consumer end and business end the cloud is turning black and ominous for traditional desktop-based computing.

A Google Premier Apps subscription is $50 per user per year, the setup is dead simple, and the user gets a series of office applications built around collaboration. While not a match for Microsoft Office products, they provide 90% of the basic functionality that any consumer or small business with a good broadband connection would need. Losing the power of Excel is tolerable if there are many upsides like ease of installation and maintenance and low running costs, and far fewer concerns about security. I constantly hear of users abandoning their Outlook-based email systems even in the workplace in favour of webmail, which comes with massive or limitless storage capacities and doesn't require them to create (and lose) .pst files when they exceed the employee email quota.

A colleague, Paul Schackenburg, recently wrote in a blog that he felt cloud computing was bad news for IT consultants who are employed to manage the complexities of desktop/server-based IT infrastructure.

I don't agree that there will be little need for IT consultants. If Paul's scenario plays out, he will be attending to new problems and challenges that will be inevitably generated by cloud computing. But, for consumers, there is little doubt the cloud will make the type of OS you use less relevant and rework the PC to act as the best client possible for apps coming down the wire. Ironically, Windows 7 may be the very last traditional desktop-based OS to come out of Redmond.

tony@acpmagazines.net

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LOOK OUT FOR THESE

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APC MAGAZINE apc HIGHLY RECOMMENDED

APC's Highly Recommended award is bestowed upon products that are of great overall quality.

APC MARCH AWARDS

Toshiba recommends Windows Vista® Business.

Introducing a very touchy subject

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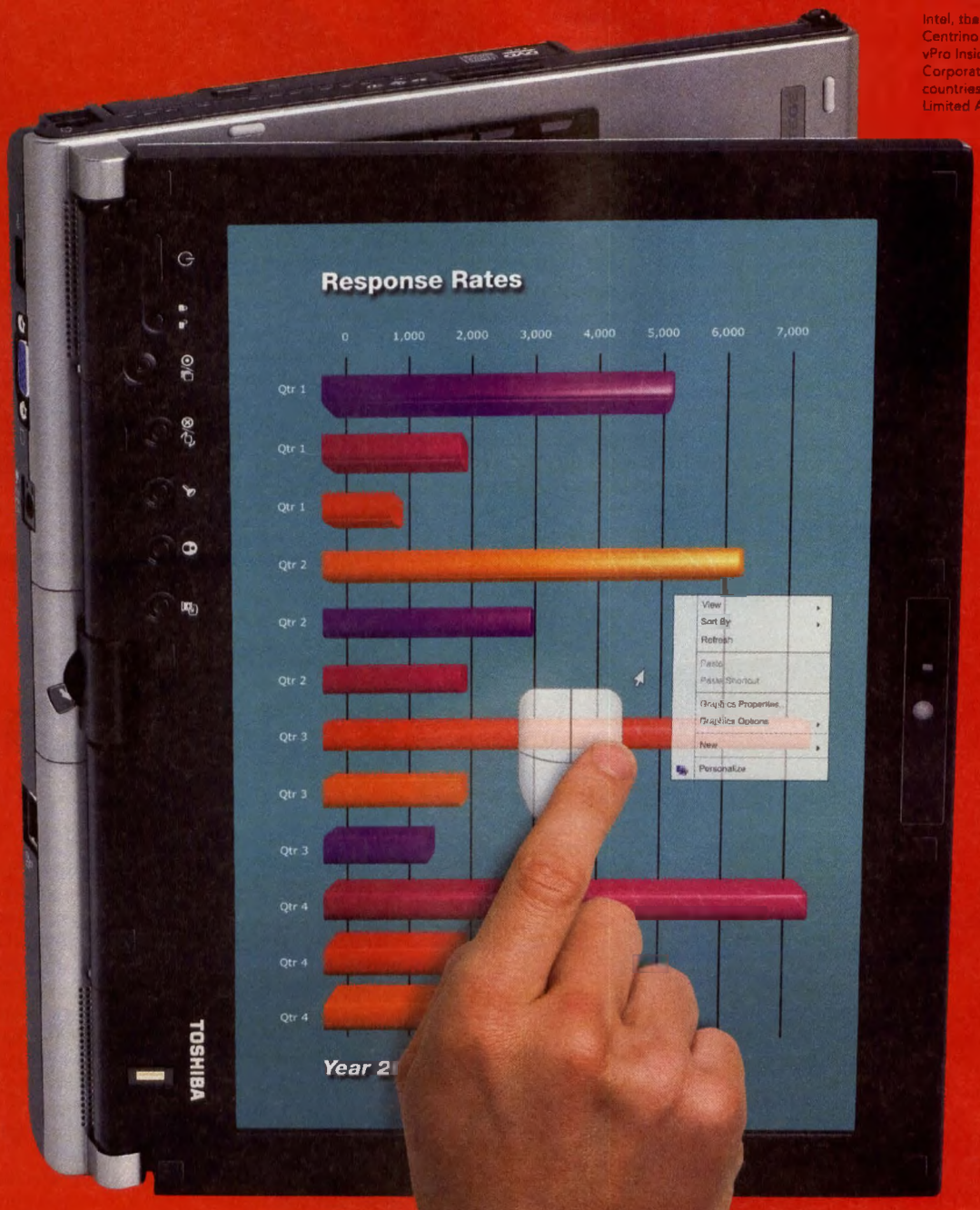

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technotes

THE NEW, THE NEWS & THE QUIRKY VIEWS

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OFFICE 14 MORE THAN ONLINE STORAGE

The next version of the Microsoft Office suite is due for release next year, according to a leaked Microsoft presentation. Office 14 will be tightly integrated with Office Web, a lite version of Office that Microsoft is working on to compete with Google's Premier Apps. Unlike the current Office Live, which simply lets you store Office docs online, Office Web introduces online editing capabilities.

VIRTUAL OFFICE COMPETITION

But Office is under attack from all sides. IBM has partnered with Canonical and Virtual Bridges to create a new Virtual Linux Desktop software package that runs from a server and delivers office applications to clients on the network. IBM claims its virtual office solution would be far cheaper per user than conventional Microsoft offerings.

BETTER SSD PERFORMANCE

SanDisk has announced a new flash-file format for solid-state drives that improves read and write performance by up to 100 times. The Extreme FFS file system improves sequential write performance by providing a direct route to writing individual pages of data. Rather than requiring a system to update and move an entire block at a time, Extreme FFS can simply write a new page to a new block and invalidate the old page.

HOT PRODUCT

Supercomputer

NVIDIA's Tesla Supercomputer has 250 times the power of a PC.

Graphics cards maker NVIDIA has created a reference platform for a super PC based around its Tesla C1060 GPUs and CUDA architecture. Called the NVIDIA Tesla Personal Supercomputer (PCS), it blows a PC out of the water with its 4 teraflops of single point processing, and it's no fantasy. Dell is likely to be the first of several big names to build it. And so can you. Unlike standard PCs, which rely on the increasing power of Intel or AMD CPUs, NVIDIA's Tesla's CUDA architecture co-opts the GPU for general processing and makes it work in tandem with the CPU.

To build a base model Tesla Supercomputer, you need at least three (or four) of the Tesla C1060 GPUs, essentially graphics cards without video ports, each with 240 cores and 4GB of DDR3 memory. Download the CUDA drivers, and the rest is just a powerful PC. The motherboard needs to have at least 3x dual-wide PCI-E x16 slots; the CPU a quad-core number from Intel or AMD; RAM of at least 12GB; a display GPU such as a Quadro FX or NVS; a PSU of 1,350 watts; an eight slot case, and Linux 64-bit or Window XP 64-bit as the OS. It would set you back around $12,000.

HOT PRODUCT

Kodak ESP 5

It's radical — charge more for printer, less for consumables.

For those of us who feel we're being had when we buy a printer for $100 only to discover that the next ink refill costs as much as the printer, Kodak has introduced an alternative — a range of printers that may not be as cheap as the latest $50 inkjets on Harvey Norman's shelves but are still affordable and far cheaper to run. Kodak's new $159 ESP3 and $199 ESP5 All-in-One (AiO) Inkjet printers let you print pages at about half the cost of similar printers thanks to cheaper Kodak inks.

One reason Kodak inkjet cartridges are cheaper is that Kodak puts the smart chip and print head in the printer. That way, consumers only pay for the ink. Other inkjet models put the smart chip and print heads on every cartridge of ink, which means the electronics increase the price.

Kodak Australia is saying the printers "won't send you broke over the long term."

TOP 10
. . .DEAD OR DYING TECHS

Several technologies and ideas that hit the wall in 2008 or are dying in 2009.

1 MICROSOFT VISTA
Mismatched with hardware. Its executioner is Windows 7.

2 HD-DVD FORMAT
Intel, Microsoft and Toshiba couldn't beat Sony.

3 VHS RECORDERS
Killed by PVRs and downloads.

4 ANALOGUE TELEVISIONS
Rubbish quality, so will 50% of Australians get off it?

5 UMPC NOTEBOOKS
Overpriced and unusable attempts at ultra-portability.

6 GOOGLE LIVELY
Google didn't get that 3D worlds are about virtual sex.

7 YAHOO MASH
Yahoo's misguided attempt to compete with Facebook.

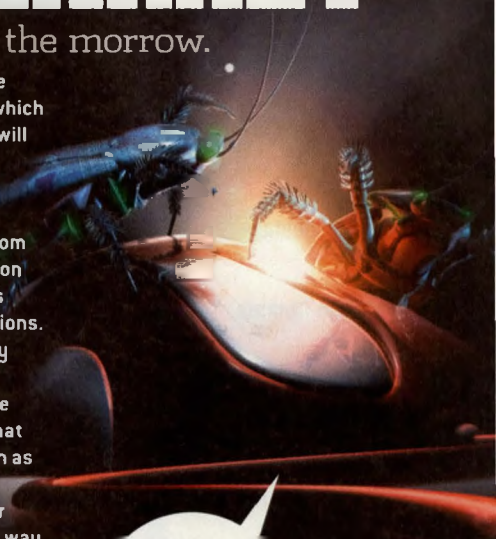
8 SPORE DRM
EA's hamfisted copy protection won't happen again.

9 JOURNAL SPACE BLOG
Backed up all its data with the wrong RAID configuration.

10 WORK-LIFE BALANCE
Pre '09 concept in tech. With recession it's now history.

MICROSOFT KILLS ANTIVIRUS MARKET

Big changes to security landscape on the morrow.



Microsoft plans to replace its subscription-based Live OneCare service with a free antivirus program codenamed Morro from July 1 this year, which may dramatically reshape the commercial antivirus landscape. Morro will provide protection against viruses, spyware, trojans and rootkits and integrate into the DNA of Windows Vista, XP SP3 and Windows 7.

Already facing competition from free offerings (such as AVG), the Symantecs and McAfees of the world need to quickly diversify away from dependence on desktop antivirus suites. Symantec, owner of the Norton brand and recent purchaser of PC Tools, is already moving its business heavily into enterprise end-to-end security and management applications. McAfee, on the other hand, lags behind Symantec and there are already rumours in Silicon Valley that it would look favourably upon a buyer.

Why is Microsoft introducing a free antivirus product? Live OneCare product manager Amy Barzdukas reportedly said the main reason is that credit card-based subscription doesn't work in emerging markets such as Asia, which Microsoft is increasingly targeting for expansion. Another reason is that Morro will have a smaller footprint that makes it ideal for netbooks. We think it's more likely that Microsoft has decided the only way to ensure consistent security for its OS and apps is to do it itself, rather than relying on third party solutions that may or may not be installed or managed correctly by users. Morro will still be a separate download though, possibly to avoid any anti-trust suits.

Free Morro antivirus for current-model Windows OSs will shake up the sector.

First 1TB solid state drive

SSD breaks major capacity barrier

It was only a year ago that the first solid state drives (SSD) were derided for their low storage capacities and obscene cost. Now, we have the first 1TB SSD, from US company PureSilicon.

The Nitro Series 2.5in SATA II SSDs start at 32GB and run right up to the 1TB monster. PureSilicon says four of the 1TB drives can yield 4TB in the same space as the standard 3.5in hard drive most servers rely on today, thereby saving both space and energy consumption.

The leap in storage is thanks to a higher data density of 15.4GB per cubic centimetre, which pureSilicon says is three times better than in any other SSD. Lastly, the drives are fast — supposedly, they push the 300MB/s limit of SATA II. Availability is slated for the third quarter of 2009.

The SSD revolution is set to accelerate this year. Most vendors are now announcing netbooks and notebooks using SSD drives, including ASUS, whose S121 comes with a massive 512GB SSD. To compete, traditional drive manufacturers will need to keep upping the storage capacity of traditional hard disks. It won't be long before a one terabyte conventional drive becomes entry level PC storage.

J Mark Lytle

TRIBAL COUNCIL...

APCMAG.COM ASKED
Optus was fined $110,000 for spamming its customers. Was this fair?
YOU REPLIED
75% 18% 7%

APCMAG.COM ASKED
Is it right for Apple to smash old Macs to bits rather than sell them at a discount?
YOU REPLIED
58% 34% 8%

HEAD2HEAD

Largely written off, Palm shocked CES with a smartphone that matches (and in some areas) surpasses the iPhone.

	PALM PRE	APPLE IPHONE 3G
UI and Display	UI with multi-touch features and gestures, but also a slide-out QWERTY keyboard. Screen is 3.1in.	Set the standard with its touchscreen UI but has only a virtual keyboard. Bigger 3.5in screen.
Connectivity and Syncing	802.11b/g Wi-Fi, Bluetooth and USB 2.0 connectivity. Includes Bluetooth 2.1 + EDR with A2DP for wireless stereo headphones.	802.11b/g Wi-Fi, Bluetooth and USB 2.0 connectivity. Bluetooth implementation is basic and can't sync like the Palm's.
Mobile Comms	Calendaring and email have built-in integration with Microsoft Exchange. Does IM, SMS and MMS. Over the air synchronisation is free.	Similar Exchange integration but doesn't offer MMS nor IM by default. Over the air synchronisation needs a MobileMe membership.
Other	Removable battery, but battery life untested as yet. 3-megapixel camera and LED flash.	Non-removable battery, but long standby time and talk time. 2-megapixel camera, no flash.
And the winner is...	Feature-wise, the Palm Pre is more than a match for the iPhone and will sell well.	The iPhone will remain the dominant consumer smartphone, but is no longer the only player in the game.

THE FORUM POLICE!

Online critic gets sued after slamming his chiropractor.

Christopher Norberg probably didn't think twice when he criticised the billing practises of his San Francisco chiropractor on the Yelp user reviews site last year. Yelp is where people with complaints about various businesses air their grievances but, as with most web forums, does not require them to provide any proof that their criticisms are accurate.

Norberg wrote that he was charged US$500 after expecting a bill of US$125, and that he later found a much better, "honest" chiropractor. This time, the victim struck back. Chiropractor Steven Biegel hit Norberg with a defamation lawsuit, alleging that Norberg had suggested he wasn't honest. Biegel also protested that Norberg had not given him a chance to discuss the posting once Biegel was alerted to it.

Clearly Biegel had a case, because Norberg decided to settle and issued the following apology: "A misunderstanding between both parties led us to act out of hand. I chose to ignore Dr. Biegel's initial request to discuss my posting. In hindsight, I should have remained open to his concerns..."

In other words, as the net matures and defamatory online criticism is able to make or break reputations, be prepared that some people might come after you...

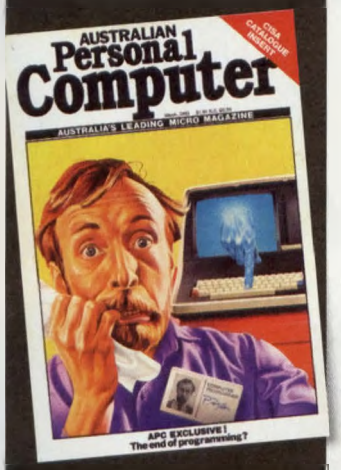
NUMBER CRUNCHING

4,700,000 iPhones were sold worldwide in Q3, 2008...

...compared to **5,600,000** netbooks during the same period

1.07% THE BROWSER MARKET SHARE FOR GOOGLE CHROME IN DECEMBER '08

THE (A)PC REVOLUTION
MAR / 1981



CBM ANNOUNCES NEW MICRO

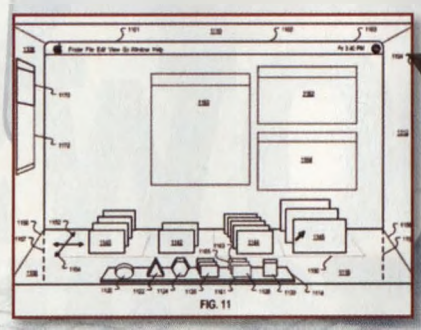
The machine, the Video Interface Computer, is going to be called VIC. It will have colour, sound, programmable function keys, PETbasic and plug-in programs. It uses the 6502A with RAM expandable to 32K and a video output of 22 columns by 23 rows. I can't wait.

WE NEED MORE POWER

Hewlett-Packard is working on a desktop computer that will run a high-level processor similar in type to the one being developed by Intel. Sources say that benchmark tests on the 32-bit machine have turned out faster than an IBM 370/158. Now the limiting factor for computing power for a desktop machine seems to be the amount of power that can be drawn from a common wall outlet without requiring special wiring.

AMAZING NEW GRAPHICS

The Texas Instruments 9918 video display processor has a basic resolution of 192 x 256 pixels with 16 colours.



THE PATENT
Apple's early sketches show its ambitious plans for a 3D GUI.

3D MAC OS!

We take a sneak peek at Apple's plans for a new-look 3D GUI.

Apple's next OS may be the first major OS to make the leap to 3D. A relatively recent patent suggests that the company is planning to implement a complete 3D GUI at some point in the future. Dubbed a 'multidimensional application environment', the patent — which was uncovered by web site Mac Rumors (**www.macrumors.com**) — essentially shows a 3D desktop that's similar to BumpTop, the Windows add-on GUI currently being developed by quirky firm Bump Technologies (**www.bumptop.com**).

Unlike Windows Vista and OS X, which dabble in 3D from a purely cosmetic point of view, the sketches included with the patent filing show that 3D will be critical in the implementation of certain elements. These include 3D icons that will fall if not placed correctly on the desktop. Another new feature involves screen edges; when you open a window it will act differently depending on where you drag it on the screen. Using a similar stacking system to that employed by OS X, documents can also be stacked behind each other in multiple rows.

The patent looks to be for a completely new OS, so don't expect these 3D tweaks to appear in Snow Leopard next year. However, the drawings do give an interesting insight into how Apple perceives the future of OS design. Although mainstream OSs are yet to get there, 3D GUIs aren't anything new. Silicon Graphics Inc used a 3D file manager for its IRIX platform many years ago. There was even a Doom hack that literally involved killing your computer's processes in what could be mistaken for a game. But the third dimension has fallen out of favour for good reason: there hasn't yet been a 3D GUI that's as intuitive or efficient as any of its 2D brethren. We look forward to seeing Apple's attempt.

Mustknow
Essential Knowledge

3D MOVIES ON A NEW HD BLU-RAY PLAYER

A third Blu-ray standard is now in its formative stages and is likely to join existing Blu-ray profiles 1.1 and 2.0 by early next year. It will allow players that support it to play 3D Full HD movies.

A number of Blu-ray player makers, including Panasonic and Mitsubishi, are proposing versions of the 3D standard, which must be ratified by the Blu-ray Disc Association. Panasonic is pushing hard, recently opening an "Advanced Authoring Center" to accelerate and establish the 3D Full HD Blu-ray format. Industry insiders are praying that the push to 3D does not degenerate into yet another format war.

The Blu-ray industry sees 3D as a great opportunity to deliver a product to homes that TV broadcasts won't be able to compete with. 3D movies need separate images for right and left eyes, essentially two video streams that require far more bandwidth than standard 2D Full HD content.

Topsite
URL of the month

XOBNI

Xobni is an amazing plug-in for Outlook that has actually dragged us back to Microsoft's ageing email client from Gmail. The free Xobni download indexes Outlook email and presents it in various highly useful views. One is instant display of all message threads with a contact; another is a list of phone numbers associated with a sender. Microsoft liked Xobni so much it tried to buy it, but price haggles killed the deal.

www.xobni.com

THE VERDICT!

WINDOWS 7 VS VISTA

The blogosphere loves Windows 7. But does the new OS fully address Vista's failures? **James Bannan** judges the new OS with the cold eye of a system admin.

Windows 7 is Microsoft's next-generation operating system and the successor to Windows Vista. First publicly demonstrated at Microsoft's Professional Developers Conference in October 2008, it was released as a public beta in January this year, and there was such a rush by users to download the build that Microsoft's server went into meltdown.

We've also got our hands on the beta and have been running it side-by-side with Vista SP1 Ultimate (32-bit), testing differences in performance, responsiveness and compatibility.

Windows 7 inherits a mixed legacy from its predecessors. Vista has struggled with a negative public perception since its release, and the stability and performance which it now enjoys thanks to two years' maturity and the major release of Service Pack 1 seems to have done little to revitalise its public image. Many users declared their intention of never migrating to Vista from Windows XP, preferring to wait for Windows 7. While this rhetoric smacks more than a little of petulance, Microsoft nevertheless had to take this attitude on board in creating an OS which builds on and improves the foundations set by Vista.

So, technically, Vista may not be that bad, but it failed at both consumer and business level. In this assessment, we look at how Windows 7 addresses the areas that crippled Vista.

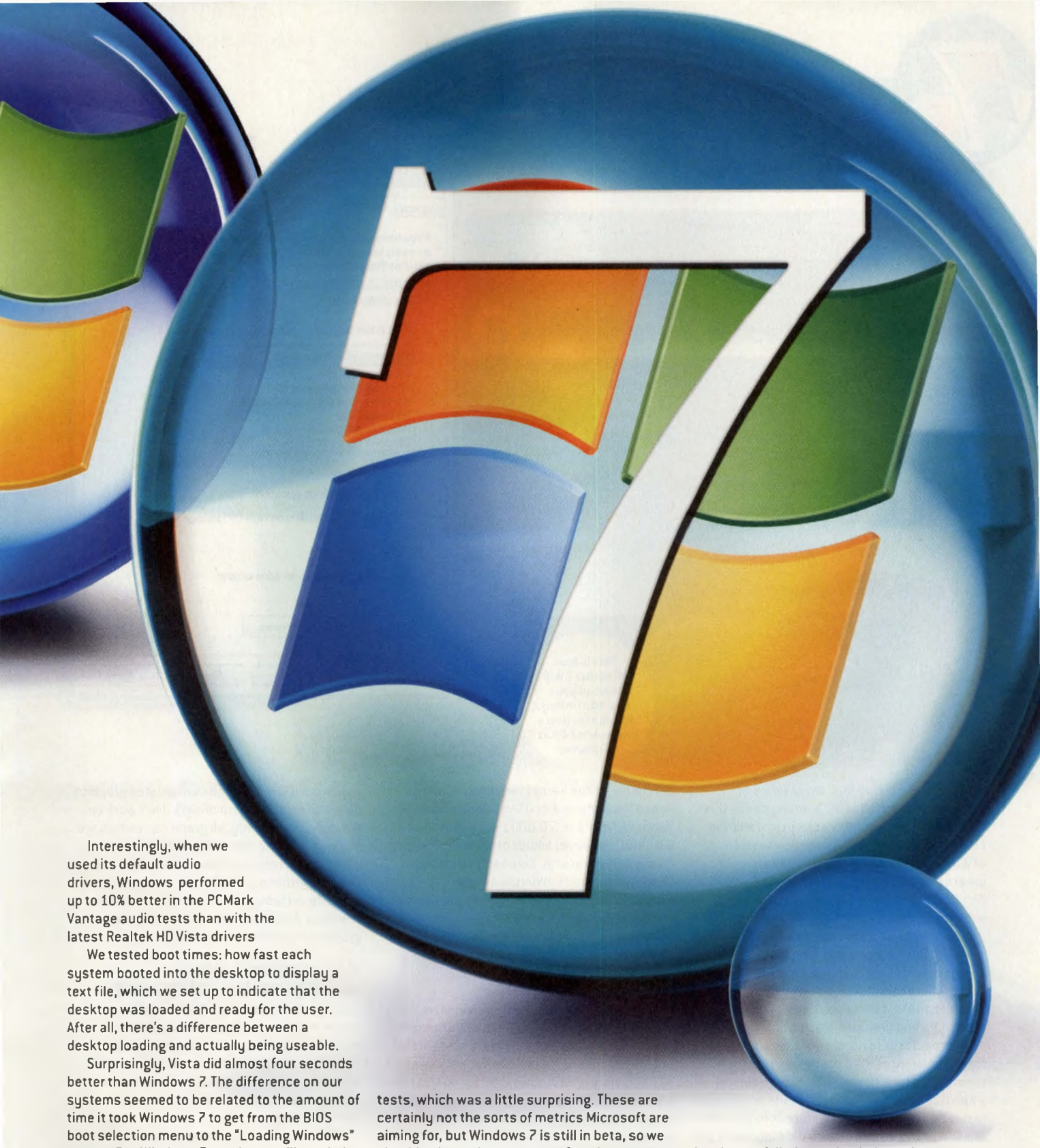
1 SYSTEM PERFORMANCE AND RELIABILITY

The Release to Manufacture (RTM) build of Windows Vista, ie., the first version to hit the market in late 2006, had some inherent problems, particularly in its revamped networking stacks. Many users complained of sluggish network and file copy performance, which was generally slower than Windows XP's in comparable scenarios and often resulted in user interface lockups. In fact, in the *APC* Labs we were astonished at how glacial the network copying was, at first thinking we'd set up Vista incorrectly. Although Vista proved to be far more stable than Windows XP when XP itself was first released, the public rightfully compared Vista RTM to Windows XP SP2 , a very mature and well-developed product which users were both familiar and comfortable with.

The vast majority of Vista's performance and stability issues were addressed in Service Pack 1, which offered across-the-board improvements for the beleaguered OS. Vista SP1 is now itself a mature and stable product, but Microsoft wants Windows 7 performance to be at least as good if not better.

We ran a series of benchmarks on our test Win 7 and Vista on our identical PC systems to identify performance differences between the OSs. We did no tweaking or optimisation on either system, used the same drivers (except for the WDDM 1.1 beta driver on the Windows 7 system) and both systems were fully patched.

We ran PCMark Vantage (a score of a computer's performance across a variety of common tasks such as viewing and editing photos, video, music and other media, gaming, communications, productivity and security) on both systems and there was an instant difference: a 9% improvement in favour of Windows 7. Vista scored better in some PCMark Vantage subtests, but Windows 7's overall superiority was clear.



Interestingly, when we used its default audio drivers, Windows performed up to 10% better in the PCMark Vantage audio tests than with the latest Realtek HD Vista drivers

We tested boot times: how fast each system booted into the desktop to display a text file, which we set up to indicate that the desktop was loaded and ready for the user. After all, there's a difference between a desktop loading and actually being useable.

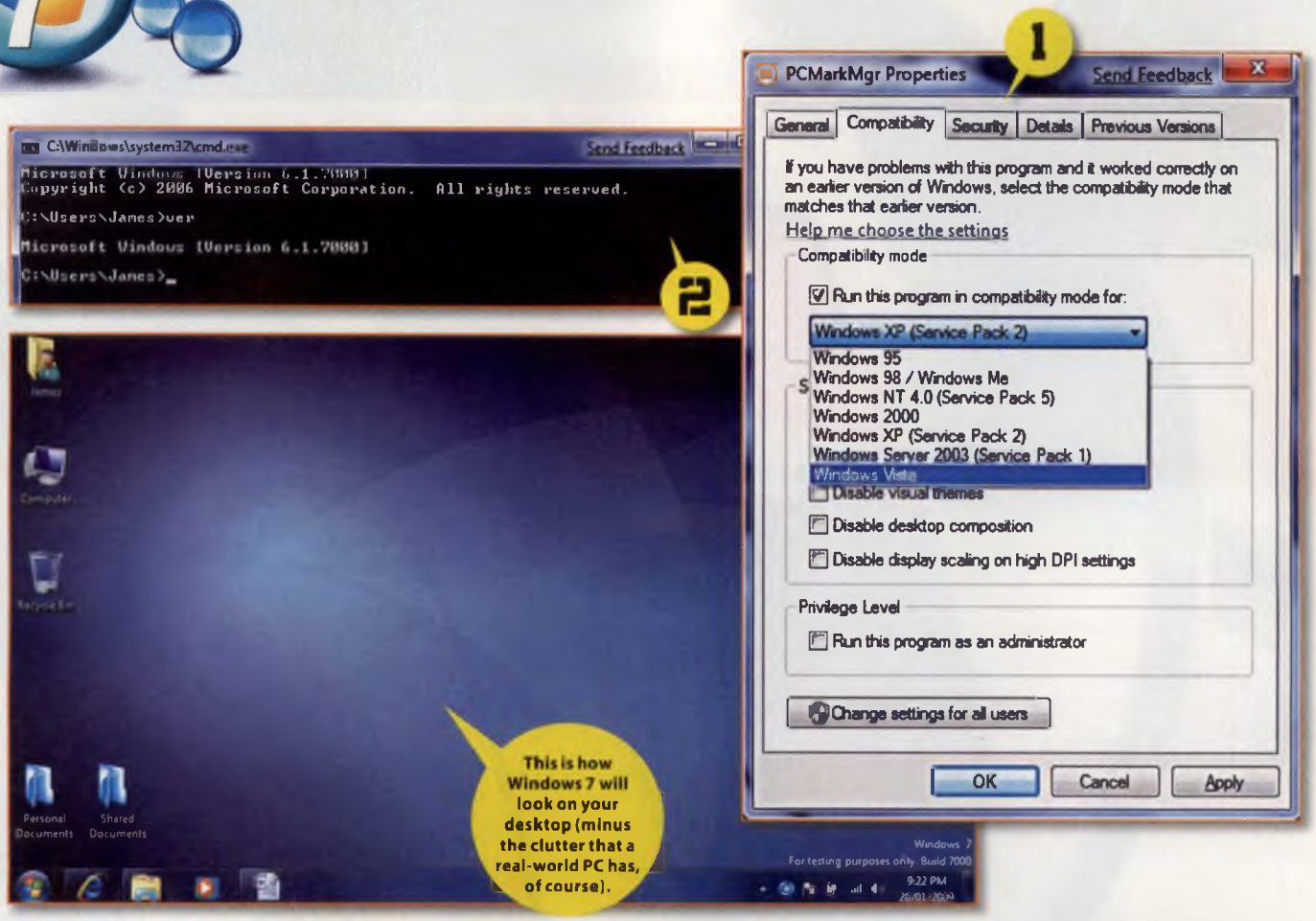
Surprisingly, Vista did almost four seconds better than Windows 7. The difference on our systems seemed to be related to the amount of time it took Windows 7 to get from the BIOS boot selection menu to the "Loading Windows" screen. But Windows 7 ran the text file task the instant the desktop loaded, even before the startup audio file had played, and there was noticeably less hard drive thrashing once the system loaded, suggesting that Windows 7 users will be able to get up and running quicker.

We also tested shutdown times and time taken to get into and out of Sleep mode. Vista actually did marginally better on most of these tests, which was a little surprising. These are certainly not the sorts of metrics Microsoft are aiming for, but Windows 7 is still in beta, so we should only see improvement from here on.

2 APPLICATION AND DRIVER COMPATIBILITY

One of the biggest problems that dogged Vista in the early days of its release was compatibility. In spite of a lengthy public beta, many hardware vendors and application developers failed to make their products compatible with the new driver model standards, enhanced security and updated kernel.

This manifested itself in a number of ways. Users found that their existing hardware was not properly supported on Vista and faced either an upgrade or a return to Windows XP. Third-party applications and drivers failed to


PCMarkMgr Properties
Send Feedback
General
Compatibility
Security
Details
Previous Versions
If you have problems with this program and it worked correctly on an earlier version of Windows, select the compatibility mode that matches that earlier version.
Help me choose the settings
Compatibility mode
Run this program in compatibility mode for:
Windows XP (Service Pack 2)
Windows 95
Windows 98 / Windows Me
Windows NT 4.0 (Service Pack 5)
Windows 2000
Windows XP (Service Pack 2)
Windows Server 2003 (Service Pack 1)
Windows Vista
Disable visual themes
Disable desktop composition
Disable display scaling on high DPI settings
Privilege Level
Run this program as an administrator
Change settings for all users
OK
Cancel
Apply
1
C:\Windows\system32\cmd.exe
Send Feedback
Microsoft Windows [Version 6.1.7000]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.
C:\Users\James>ver
Microsoft Windows [Version 6.1.7000]
C:\Users\James>_
2
This is how Windows 7 will look on your desktop (minus the clutter that a real-world PC has, of course).
Personal Documents
Shared Documents
For testing purposes only. Build 7000

run properly, caused system crashes or even failed to install at all. In many cases this was due to hard-coded checks in installation scripts that looked for a particular version of Windows: when the script found an unrecognised version of Windows (as dictated by the kernel version) installation simply stopped.

1 In some instances this could be overcome by using Vista's Compatibility Mode, but there were too many cases where this failed to overcome the problem and Vista was painted as being an unfriendly and unstable platform.

Microsoft could hardly be held responsible for the inability of third parties to prepare themselves for a new platform, particularly when that platform had been made accessible to developers a long time before commercial release. Many other vendors did manage to get their products ready, but maybe Microsoft was naive in the extreme to assume everybody would jump to create drivers for the new OS. The driver issue was one of the first true killer blows for Vista's reputation, so Microsoft is now determined to avoid the same with Windows 7.

2 Compatibility issues caused by scripting checks should be kept to a minimum, as the kernel version in Windows 7 keeps the same major OS version as Windows Vista: Vista SP1 is 6.0.6001 while Windows 7 is 6.1.7000. However Microsoft isn't just relying on the kernel version. Compatibility Mode in Windows 7 includes Windows Vista compatibility as well as everything else down to and including Windows 95. During our own testing we did encounter some applications that failed the prerequisite check, but using Vista compatibility solved this issue completely and simply.

Microsoft has a lot riding on Windows 7's ability to slot into existing user environments and it's working to an unofficial standard that any hardware or application that works on Vista will also work on Windows 7. So far our testing has shown this to be the case across a wide range of hardware platforms and third-party applications.

The one area where there is some change is with graphics drivers. Window Vista introduced the Windows Display Driver Model (WDDM) that drives many new features such as the Windows Desktop Manager (WDM), which enables Vista-specific features like Aero Glass and Flip 3D.

Windows 7 also uses WDDM, but it is an updated version (WDDM 1.1) which enables features like DirectX Video Acceleration for HD content. WDDM 1.1 needs an updated graphics driver so existing Vista drivers don't work on Windows 7. Currently, all graphics vendors are working with Microsoft to make WDDM 1.1-compliant drivers available, and for the beta they are either available from the vendor's web site or through Windows Update. What Windows 7 will not require, however, is new graphics hardware.

3 RESOURCE AND HARDWARE REQUIREMENTS

A trend in the evolution of operating systems is that each new version demands more resources than its predecessors, and this was certainly the case with Windows Vista. In fact, it was the case to such an extent that many users had to upgrade in order to be able to run Vista properly.

Of course, given the length of time between Windows XP and Windows Vista, it was unsurprising that the hardware requirements were greater than XP's and more in line with the specifications of PC systems available at the time, but this was yet another strike for Vista in users' minds.

Windows 7 bucks the trend by actually being less resource-hungry than Vista. On our test systems, the Windows 7 machine used

only approximately 470MB of RAM on a clean boot, compared with 650MB on the Vista system: 180MB of difference that now can go to applications. Of course, you can tweak Vista to use less memory, reduce hard drive read/writes and optimise CPU performance, but the fact that Windows 7 runs more efficiently out-of-the-box is a massive tick in its favour.

Windows 7 also uses a different memory allocation model for multiple windows compared to Vista. With Vista the more windows you opened the more memory you chewed up, and the memory usage could get quite high. Windows 7 avoids this problem so you can maximise productivity without impacting system performance.

All this suggests very strongly that consumers will get more out of their Vista-based systems by running Windows 7, which is precisely what Microsoft is aiming for.

This is also great news for netbook users. The netbook market has exploded but hasn't been able to take advantage of the latest operating systems: by default they are licensed for either a vendor-specific build of Linux or Windows XP. Although it is possible to run Windows Vista as a netbook platform, the fact that it is undeniably more system-intensive than Windows XP means that it is unlikely to be offered as an OEM system by netbook vendors.

This has hurt Microsoft's bottom line: XP is far less profitable than Vista and is rapidly approaching end-of-life, so Windows 7 should not only revitalise sales in this budget section of the market but also offer users a genuinely good netbook experience.

4 CHANGES TO THE USER INTERFACE

3 Not everyone likes Aero Glass, and it can be turned off completely. But there's still a redesigned UI to get used to and no matter how hard you try Vista won't ever look and feel exactly the same as XP's. Aero Glass aside, for most users Vista's new UI didn't pose a problem because Vista offers a relatively familiar desktop experience to Windows XP. The buttons are in the same locations, the Start Menu functions the same way, Quick Launch toolbars are still there and so on.

Not so with Windows 7. Now some serious changes to the UI are evident and they are a definite improvement. Not surprisingly, this is one area where beta users of Windows 7 have been in agreement.

HE SAYS...

"I'm a high end IT professional, I know what works..."

"Kaspersky Open Space Security has drastically improved the security of our IT infrastructure. Thanks to Kaspersky, even our problematic sites are virus free and our users are no longer troubled with adware."

✓Kaspersky delivers

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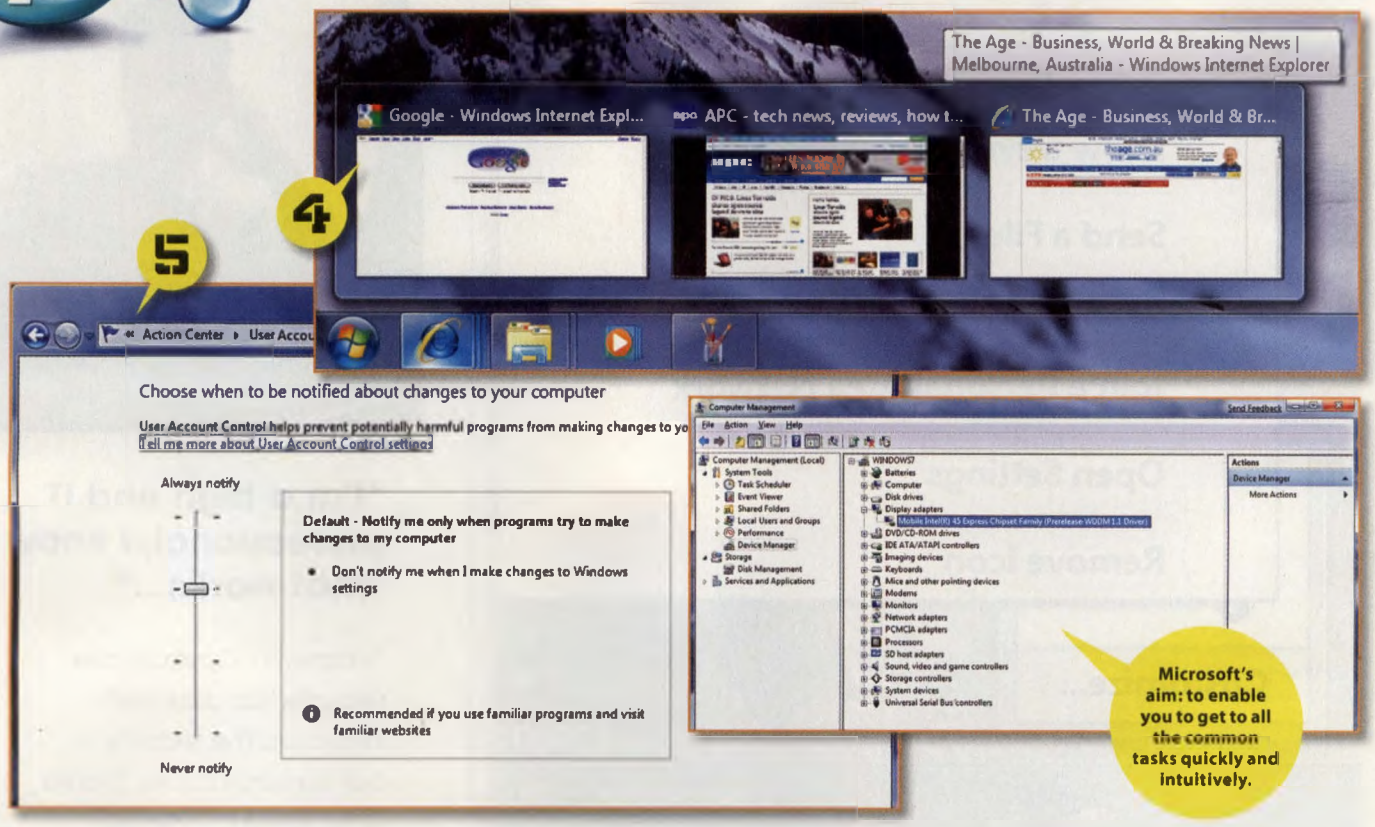

The Age - Business, World & Breaking News | Melbourne, Australia - Windows Internet Explorer
Google - Windows Internet Expl...
APC - tech news, reviews, how t...
The Age - Business, World & Br...
4
5
Action Center
Choose when to be notified about changes to your computer
User Account Control helps prevent potentially harmful programs from making changes to yo
Tell me more about User Account Control settings
Always notify
Default - Notify me only when programs try to make changes to my computer
Don't notify me when I make changes to Windows settings
Recommended if you use familiar programs and visit familiar websites
Never notify
Microsoft's aim: to enable you to get to all the common tasks quickly and intuitively.

Win 7's boss, Parri Munsell, told *APC*: "We wanted to make sure that you could get to all the common tasks quickly and intuitively,"

4 Open applications now group themselves into jump lists. Similar to the application group functionality in Windows Vista (where if you open multiple sessions of Word or IE they group together in one taskbar), in Windows 7 this is the default behaviour for all open applications. But the functionality has been radically extended. Right-click on the jumplist and you get a list of recently-opened sessions. Hover over any open application in the list and you get a preview of the app that you can click to, navigate away from or close down without having to go into that particular session.

The system tray has also been given an overhaul. Rather than having to work out which icons you want to display, Windows 7 hides them all by default to reduce clutter. You simply expand the list and customise which icons you want to see more regularly, if any.

Certain tasks have been made much more accessible. Connecting to wireless and Bluetooth networks in Vista could be a labour-intensive process, but in Windows 7 it's been streamlined extensively. For wireless networking, click on the network icon and you get a list of available wireless SSIDs for quick connection. Right-click the Bluetooth icon and you can quickly list available devices or connect and get connected.

Window manipulation has also changed. Drag a window up to the top of the screen and it maximises. Restore it by dragging it away. Drag a window to the left or right-hand side of the screen and it resizes to half the screen and docks: perfect for side-by-side reading. Compared to Vista's UI, the Windows 7 UI really is a joy to use. It's unobtrusive and clearly has a lot of underlying smarts. Vista users will find it familiar yet obviously improved, whereas XP users will be simply blown away.

"The movement from Vista to Windows 7 is a refinement," explains Munsell. "We didn't want to change methods of interaction too much: we wanted users to be able to carry across what they've learned, while still making Windows 7 a powerful new way to get things done faster... We made a lot of design changes from XP to Vista, and Windows 7 moves the experience even further away from XP."

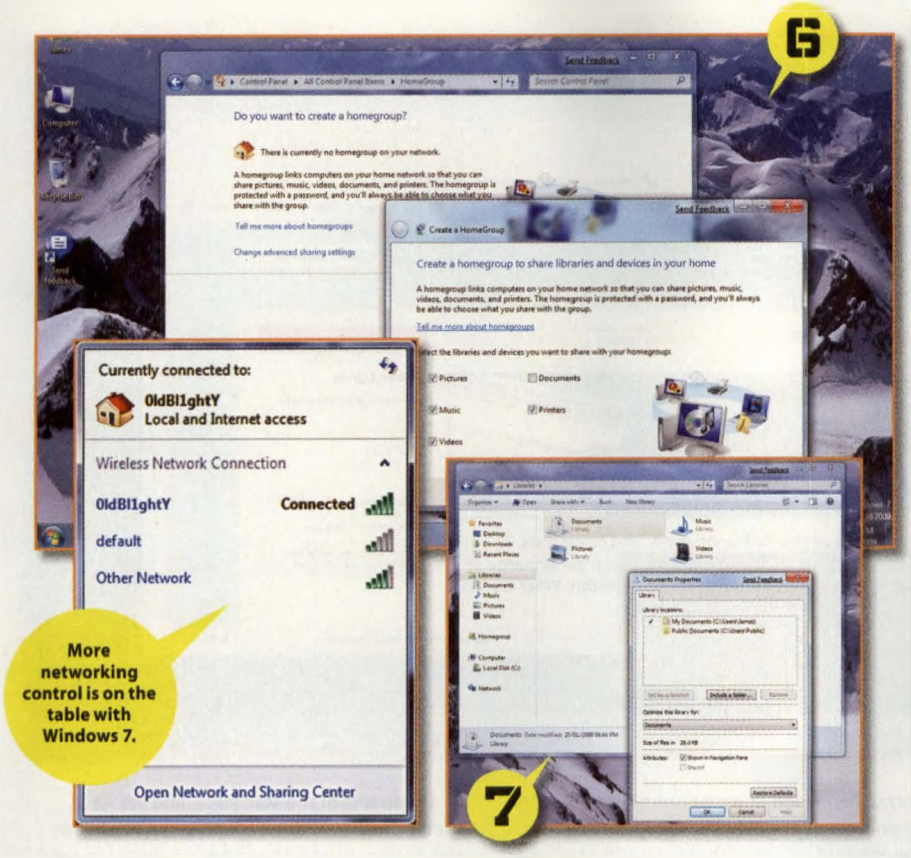
5 USER ACCOUNT CONTROL

UAC was first introduced in Windows Vista and was designed to minimise the impact of malicious software by limiting all aspects of the user experience to that of a limited user. When an application required elevated privileges, Vista prompted the user to either allow the elevation (if the user was an Administrator) or to enter administrative credentials accordingly. UAC sought to overcome the impact of the traditional XP security model, where users were more than likely to have full administrative rights to the machine, and therefore any application run within the user session had full access to user files, system files and the machine registry.

The problem with UAC is that there are many events that trigger an elevation prompt: installing applications, moving or deleting protected files or changing system settings. Each time an event is triggered, the UI goes into Secure Desktop mode until the user deals with the request. For advanced users this was seen as an intolerable intrusion, and for less experienced users as a particularly visual frustration. Additionally, many third-party applications assumed full access to the system and weren't able to cope with UAC, causing even more compatibility problems.

The issues were such that the first thing many users did when installing Windows Vista was to disable UAC. While this removed the annoying elevation prompts, it also prevented new security features from running, such as file and registry virtualisation and Internet Explorer Protected Mode, thus leaving both the user and system exposed.

5 Windows 7 makes full use of UAC, but now allows the system to be fully configurable. By default UAC in Windows 7 will not prompt the user for elevation when


Do you want to create a homegroup?
There is currently no homegroup on your network.
Create a homegroup to share libraries and devices in your home
Currently connected to:
OldBl1ghtY
Local and Internet access
Wireless Network Connection
OldBl1ghtY
Connected
default
Other Network
More networking control is on the table with Windows 7.
Open Network and Sharing Center

making system changes, but this can be dialled up so that UAC always prompts the user (equivalent to UAC in Windows Vista), dialled down so that the Secure Desktop is not invoked during a prompt, or even so that the user is never prompted at all. Although not very secure, this last option is still more secure than disabling UAC completely, so Windows 7 essentially offers a more secure user environment without the in-your-face prompting.

HOME NETWORKING AND FILE SHARING

The home networking model in Windows Vista was very similar to that seen in previous versions of Windows. There were some improvements, such as remote access to media on other Vista machines via Windows Media Player and integrated recognition of UPnP media players. But the basic setup of accessing files was exactly the same: setting up shares and access rights.

Windows 7 offers something completely new and different: Homegroup networking. This feature allows users to easily define a secure internal network (eg: "Family Net") with a passphrase. Windows 7-based systems joined to this network can automatically see and share resources such as files and printers.

Homegroup networking ties in closely with another Windows 7 feature, which is libraries. Libraries are collections of static folder locations that act as search folders. For example, the Documents library is set by default to scan My Documents and Public Documents, but you can add more folders from either the local machine or a network location. The library view shows all files and folders across all targeted locations, so you don't have to navigate around as much. There are default folders for Documents, Music, Photos and Videos and you can create as many as you like. All libraries can be shared out across the Homegroup, and the contents are catalogued into libraries on other machines.

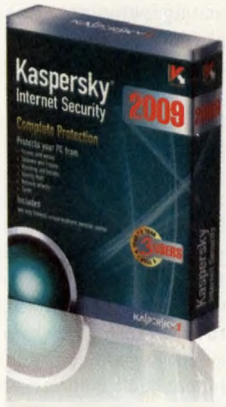
For example, if you share the Documents library out from one machine, the contents will be amalgamated into the Documents library on another Homegroup-connected system. This way, Windows 7 systems seamlessly share resources in a peer-to-peer environment and users never need to know precisely where files are kept. While this may not necessarily appeal to file-organising pedants like me, it's a fantastic way for users to get their systems talking. It also gives a firm context for Microsoft's emphasis on metadata, which was introduced in Windows Vista. Whilst metadata has been around for ages, in Vista it was far more obviously

SHE SAYS...

"I want peace of mind so I look to IT professionals for advice."

"I love this product!! This is one of the best internet security programs I have used! Kaspersky updates my anti-virus definitions every hour on the hour and the firewall is excellent with no leaks at all! Oh, and the anti spyware and ad blocking are excellent as well!"

✓Kaspersky delivers



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Every corner of Windows 7 is improved compared to Vista — there's even a list of IE8's open tabs.
twitter
What is Twitter?
Watch a video!
Please sign in
Twitter is a service for friends, family, and co-workers

integrated into Windows Explorer, with little obvious benefit, but libraries and Homegroup networking are precisely the context in which metadata and personalised information shines.

7 OVER-PROMISED, UNDER-DELIVERED

In an industry which always looks ahead, it's easy to forget events in the recent past. When Vista was in development, it was shaping up to be a revolutionary operating system: light years ahead of Windows XP and offering users a completely new computing experience. Then, as time dragged on and the launch date was put back further, Microsoft ditched some of the more exciting features such as WinFS (Windows Future Storage), the "Avalon" presentation layer and the "Indigo" communication layer.

"Avalon" and "Indigo" were subsequently rebranded as Windows Presentation Foundation and Windows Communication Foundation respectively and bundled into the .NET 3.0 Framework, which was shipped with both Vista and Windows Server 2008, so in the end these technologies were not actually dropped (although WinFS has yet to be released in any form). However, all these widely publicised changes during Vista's development cycle only served to gradually take the gloss off the initial excitement which had built up around the new OS.

When Vista was finally released in November 2006, general consumer sentiment was at best one of suspicion rather than enthusiasm, and at worst one of hostility. And when it gradually came to light that there were a number of issues with the new OS, there was widespread criticism. As unfair as it might be, Vista has become associated with Windows ME in Micosoft's pantheon of historic failures.

Microsoft has played a very different game with Windows 7. Not only has it kept a very tight reign on the flow of information to the public but is insisting that the Windows 7 development cycle has been driven by consumer sentiment and the mistakes learned from Vista rather than lofty ambitions to create a revolutionary new OS.

"There were definitely negative perceptions with Vista," says Munsell, "and those perceptions could have carried through, so one of the very first things we did in the Windows 7 development cycle was to listen, learn from our previous experiences and understand what counted most." Opinions and reviews about the Windows 7 beta seem to suggest this approach has been vindicated, as user comments throughout the blogosphere have very little bad to say about Windows 7.

8 PRESSURE FROM THE COMPETITION

To add insult to injury, Apple launched its "Get a Mac" ad campaign in 2006. Described in some circles as being mean-spirited with its attitude of smug superiority, the Apple campaign was nevertheless ruthlessly effective in painting Microsoft, and Windows Vista in particular, as being slow, cumbersome and unappealing.

The timing of the Mac ads could not have been worse for Microsoft and Vista. Apple was able to dance in and hang an "I'm Really Uncool" sign around Vista's neck. Users who had not migrated from Windows XP now felt justified in holding back, and other users even took the opportunity to abandon Windows altogether. Microsoft was slow to respond and was heavily criticised for seeming to allow Apple to dictate trends in personal computing.

Microsoft's marketing comeback took the form of a series of ads featuring Jerry Seinfeld and Bill Gates and later the "I'm a PC" ads. The ads lacked the edge and polish of the "Get a Mac" ads and paradoxically only seemed to reinforce Apple's campaign message.

Windows 7 is being introduced into a different market than which Vista found itself. Whilst Apple is still considered the haute couture fashion of the IT industry, it is being strongly criticised for ignoring the trend towards low-cost computing as represented by the netbook. iPods and iPhones are runaway successes in their respective markets, but this has not translated into mass migration away from Windows.

Right now, Microsoft is keeping the marketing on Windows 7 to a minimum and allowing the product to speak for itself, which so far is proving to be an effective tactic. In the same way that negative reinforcement destroyed Vista's public image, the reverse seems to be happening with Windows 7, and Microsoft appears poised to come to market with a solid operating system.

The reasons Windows 7 is popular with consumers should flow through to business.

Windows 7 vs Vista in Business

Windows 7 is making all the right noises in the consumer space, but how does it stack up for business users and the enterprise segment?

THE CASE FOR VISTA

Very few businesses follow the same sort of technology adoption cycle as consumers. The issue is usually one of scale: more users to support, more cost to implement new technology, more people to consult, more business processes and requirements to satisfy, more dependencies to migrate and more damage and disruption if things go wrong.

As a result, when a new version of Windows is released you don't tend to see businesses making a move away from their existing standard operating environment (SOE) for twelve to eighteen months: often around about the time of the first service pack. Vista was no exception to this, but in its case businesses have waited even longer than usual.

Migrating from Windows XP to Vista presented certain problems, such as increased hardware requirements and upgrades to supporting infrastructure. Because businesses operate on "needs" rather than "nice-to-haves", most get by with an IT infrastructure far beneath the level of the average enthusiast, and so the issues in the consumer space about the necessity to upgrade in order to be able to run Vista were hugely amplified in enterprise.

One phenomenon which we did see with Vista was consumer sentiment and mass media opinion flowing through to business opinion, with many IT pros and CIOs declaring their intent not to consider migrating. Even the prospect of an imminent service pack didn't seem to do much to sway opinion.

However, Vista has gained back some of its lost reputation in the enterprise space thanks to the release of Windows Server 2008. This has proved to be an exceptionally popular server OS and a very strong product in its own right: easy to use, powerful and flexible.

Server 2008 was also marketed as the key to unlocking Vista's full potential in a business environment. The updated networking stack which caused so many issues in Vista's early days was really designed to function best in a Server 2008 environment and offered users much faster and more secure file transfers especially over high-latency, low-bandwidth connections. Group policies to fully manage Vista are only available in Server 2008; image building and deployment services for Vista work best on Server 2008, and so on. To make the most of Vista you needed Server 2008, and once you had Server 2008 the path to Vista was obvious and more compelling.

In this scenario, Microsoft's decision to bundle Hyper-V virtualisation in with Server 2008 RTM was a stroke of genius, even though it was still in beta. It gave Microsoft a lever to promote Server 2008, and once adopted by

Microsoft's determination to minimise compatibility problems can only help business.
Control Panel
Search Control Panel
Adjust your computer's settings
Click on a category or use the Search box to find tasks quickly.
System and Security
Review your computer's status
Back up your computer
Find and fix problems
Network and Internet
View network status and tasks
Choose homegroup and sharing options
Hardware and Sound
View devices and printers
Add a device
Programs
Uninstall a program
User Accounts and Family Safety
Add or remove user accounts
Set up parental controls for any user
Appearance and Personalization
Change the theme
Change desktop background
Adjust screen resolution
Clock, Language, and Region
Change keyboards or other input methods
Change display language
Ease of Access
Let Windows suggest settings
Optimize visual display
All Control Panel Items
Documents library
Windows 7

enterprise it was far easier to start contemplating a migration to Vista, which many businesses are now doing.

But the complexities of deploying Vista in the enterprise are still with us. Microsoft has provided a massive range of tools, guidelines, documentation, e-learning and videos to assist IT pros prepare their environment, do testing and start migrating, but while all of this helps no end, you still have to sit down and learn it all. Migrating to Vista takes a huge amount of work.

None of these issues disappear with Windows 7. It's an evolution of Vista, so the underlying architecture is very similar, and the various management and deployment tools which work with Vista also work with Windows 7. On one hand this is great news for enterprise: it means that Windows 7 offers a familiar environment and won't require much effort to integrate into existing Vista-based scenarios.

The downside is that by waiting for Windows 7, businesses won't suddenly be in a better position. I've written quite a lot about how if enterprises are really set on migrating from XP to Windows 7, they still have to do all the work as if they were migrating to Vista. And the issue is, although Windows 7 looks the goods, it's only in beta; full release is months away.

Microsoft says Vista SP1 is a stable, mature product and it's with us right now. Redmond would like to see Vista as a stepping stone to Windows 7. "Organisations considering upgrading should definitely look at Vista SP1," agrees Munsell. "It's a mature platform and, because one of the basic tenets of Windows 7 was that it should provide a smooth upgrade experience, enterprises can have confidence that by deploying Vista they will create an environment conducive to Windows 7 down the track."

THE CASE FOR WINDOWS 7

Many businesses who have not migrated to Vista (probably the majority) will go directly from XP to Windows 7. From my testing of it, Win 7 should make a great business platform.

All the reasons why Windows 7 is proving to be popular with consumers will flow through to business users too. Although they don't tend to care too much about which operating system has been put in front of them as long it doesn't get in the way of their job, users are nevertheless aware of what's going on in the wider world. Give them an OS which they've heard bad things about and they'll be on the phone complaining at the first sign of an error message. However, provide them with an OS which is popular, well liked and (more importantly) not the other one and they'll be far more likely to give it a go. Yes, we manipulate users shamelessly. Sometimes it's the only way.

The combination of Vista and Server 2008 has proved to be popular with IT pros, and the Windows 7/Server 2008 R2 team will continue along the same vein. Unfortunately, there is a small gotcha. In the same way that Windows Vista works best alongside Server 2008, Windows 7 works best with Server 2008 R2. Luckily the difference isn't as profound, but there are features such as BranchCache and enhanced group policies that aren't supported on Server 2008. Server 2008 R2 is going to be 64-bit only, so there won't be an upgrade path for any existing 32-bit systems.

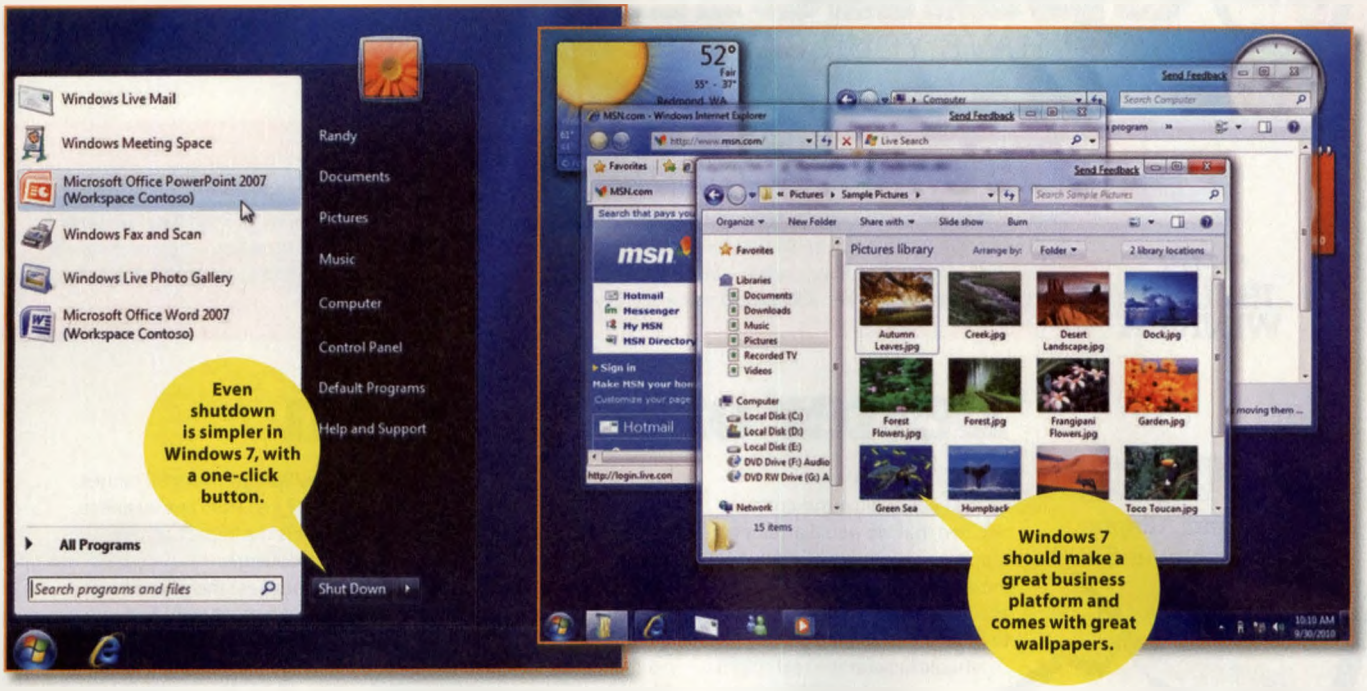
But there are some new features that will add value to an SOE based on Windows 7, which will make the back-end difficulties worth overcoming:

1 ENHANCED COMPATIBILITY

Microsoft's determination to minimise the compatibility problems that plagued Vista, in terms of both hardware and applications, can only help business deployments. Enterprises usually have the benefit of a reasonable amount of standardisation of system hardware, or at least variation is kept to a minimum, and this scenario works extremely well with operating systems that support a wide range of systems and devices (as you're far less likely to encounter compatibility problems in such scenarios).

2 APPLICATION CRASH RESILIENCY

Businesses live and die by their internal applications, as they are so often industry-specific and tailored to that particular company's work practices. Problems with an application mean lost productivity, and that's never a happy time. Windows 7 can actively monitor any application which is crashing out and will actively try and work out why. If it succeeds, it will apply a shim on the fly to get the application up and running. Admins can then access the workaround and deploy it out across the corporate network, proactively circumventing the problem and minimising disruption.



3 ENERGY EFFICIENCY

For a highly mobile workforce, being able to squeeze as much juice out of your notebook can be a mission-critical concern. Windows 7 can run diagnostics across any system to check whether there are any processes chewing up CPU cycles, preventing hardware from shutting down properly or anything else that might adversely affect battery life.

4 MOBILE DATA PROTECTION

USB keys are pretty much a throw-away commodity these days, but they can still store gigabytes of sensitive corporate data. Rather than risk such devices being left on the train (or in a competitor's foyer), admins can now use Windows 7 and group policy to enforce BitLocker encryption on removable devices.

5 PROBLEM STEPS REPORTER

This nifty tool allows users to take step-by-step screenshots of their systems and send the report, images and technical information through to support staff.

This is great for support scenarios where you can't remotely connect to a user's machine and are having difficulty extracting information over the phone.

6 WINDOWS 7 APPLOCKER

Using new GPO wizards in Server 2008 R2, admins can specify in detail which applications are allowed to run on domain-joined Windows 7 systems, eliminating the potential for unknown and untrusted third-party apps to be introduced onto the corporate network.

7 TROUBLESHOOTING PLATFORM

Users are far more likely to pick up the phone and call IT rather than help themselves when a problem arises. However, there are always times when support isn't to hand, and this collection of PowerShell scripts which step the user through a troubleshooting process is no bad thing. It's based around the top 100 queries sent through to Microsoft Premier Support, so their relevance to everyday computing is guaranteed.

Because there's always so much do to, IT pros and admins are always looking for ways to streamline tasks and stop small problems before they become big problems. Although Windows Vista is technically a good business OS due to its stability and value-adds, it doesn't have the sort of smarts that come with Windows 7.

An OS which can self-diagnose, self-heal and provide both users and admins with a friendly "let's work together" experience is an exciting prospect for IT admins. APC

WILL WINDOWS 7 WORK FOR MICROSOFT?

So far, Windows 7 is shaping up to be better than Vista in pretty much every respect, and if public opinion is to be taken as a marker of things to come, then Windows 7 is on its way to succeeding.

The beta product has a slick and intuitive feel which is truly impressive, and it's a genuine pleasure to use. Microsoft has done a great job of loading the product with plenty of smarts, and the result is a product where it really feels like everything has already been thought of. It's incredibly user-friendly and accessible, whilst remaining flexible and powerful. Windows 7 has already been dubbed "Vista as it should have been". Perhaps that's true, but Windows 7 is certainly no hotfix or rebranded service pack.

Windows 7 is very clearly going to be the operating system benchmark and looks set to [redacted] revitalise and dominate the PC industry.

22 epinions
HAVE YOUR SAY

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Come on, have your say! We want to hear what you think. Add to these discussions or email your views (in fewer than 250 words) to epinions@acpmagazines.com.au. All correspondence becomes the property of *APC* and is subject to editing. Letters must include writer's full name, street address, suburb, state and phone number to be considered for print publication and to be in the running for Letter of the Month prizes. Address and phone details will not be published.

THIS ISSUE'S WINNER

Stephen wins a TP-Link Wireless N Router and Adapter bundle worth over $200.

Letter of the month

GOING GREEN

So the Federal Government decided that we would attempt to stop global warming by banning incandescent bulbs and only allowing "energy efficient" bulbs to be sold. I suggest the Feds should look for the real culprits.

Back in 1988 I reckon the average PC power supply had a massive 50 watt capacity. I can certainly remember in the mid '90s updating to a 150 watt supply. Now a 350 watt supply is "ho hum" and many machines are needing 500+ watts to power that Quad-Core Processor and dual graphics cards etc.

If my employer upgraded to Vista on our 600+ PCs, each machine would be consuming say 50 watts extra power for at least 8 hours a day 250 days a year.

Can you believe it? That's an increase of 240kWh a day or $48 of energy! That's 60,000kWh or $12,000 a year increase in electricity. According to **tinyurl.com/8jbyyw** that's 60 tonnes of C02 just from one business. What is the impact across the country?

I suggest the government should instead put a 60% reduction target on the 2009 average power consumption of PCs sold in Australia, and companies failing to meet these targets not only get a Carbon Tax hit, but lose all access to government supply contracts.

Stephen Bitmead
Uleybury, SA

APC readers get all excited about expansion ports, PCI-E x1 cards and a mixed bag of issues that have got their goats.

LEGACY PCI-E SLOTS

Correct me if I'm wrong, but I believe a point may have been missed in your January '09 Letter of the Month column. The writer bemoans the lack of PCI-E x1 and legacy PCI slots on premium motherboards because the emphasis is now on providing more, larger slots for multiple video cards.

By design any smaller (eg. x1, x4) sized PCI-E card should work in a PCI-E slot that's at least as large as the card. Certainly, inserting an x1 card in an x8 or x16 slot will accommodate a card that otherwise mightn't fit elsewhere (as is the case with one of my long tuner cards in my Media Centre PC).

However, the problem with inserting x1 PCI-E cards into larger slots is that, due to bandwidth sharing arrangements, the motherboards may slow or disable other slots. For instance a x16 slot may slow to x8. Further, a x4 slot being activated may disable other x1 slots. A trip to the motherboard user manual usually reveals these pitfalls. That said, there's usually some way of utilising PCI-E slots to accommodate the cards you want to use. And given that manufacturers still tend to include at least one legacy PCI slot I don't know there's really much of a problem.

Jamie Norman
Research, Vic

MANY ANSWERS

Regarding Steward Dodge's complaint in January's Epinions, here are some answers.

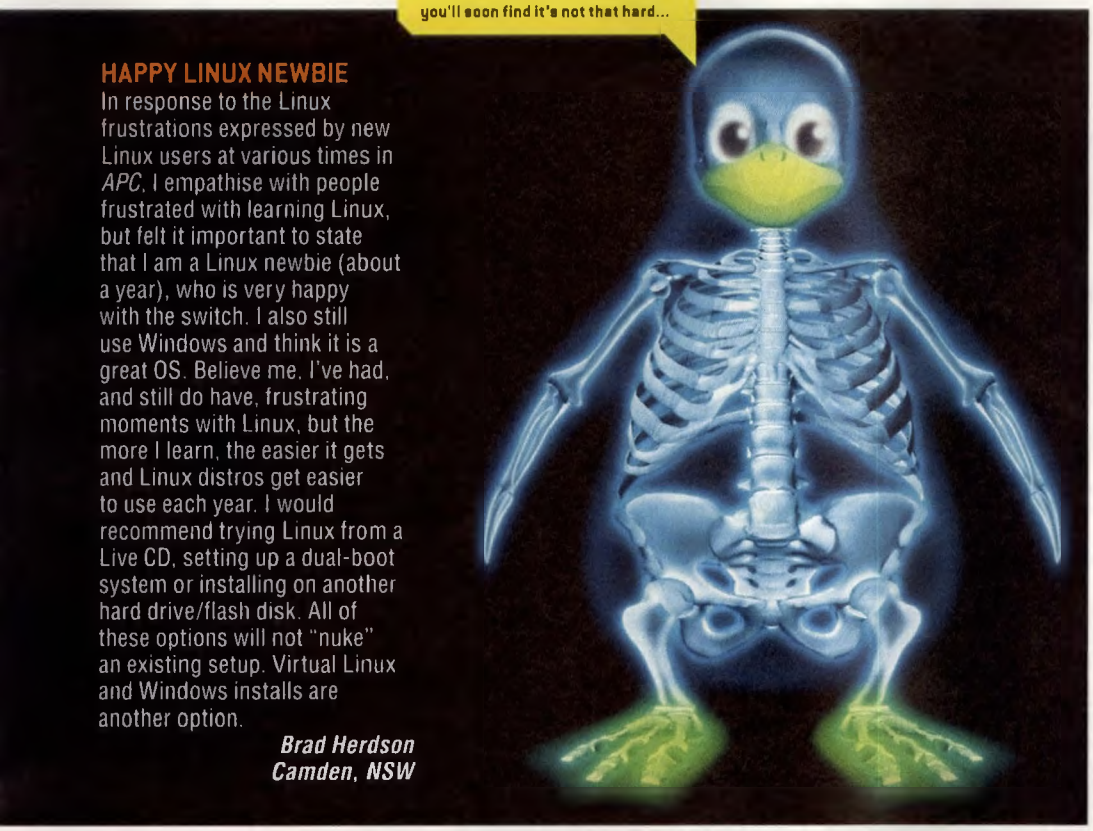
1. Larger monitors have higher resolutions that require more than one graphics card to play modern games at maximum settings. If you're running Crysis on a 17in screen, a single graphics card is fair enough, but 1,680 x 1,050 is simply not playable on maximum settings with any single GPU card.

2. PCI-E x1 cards can fit in x16 slots just fine! There's nothing stopping you from shoving that RAID card or sound card in a spare x16 slot. It automatically detects the x1 card and sets the slot for x1 operation.

3. Why do you need so many expansion ports? Granted, if you dislike onboard sound, or you're an "Audiophile", or you're making a HTPC and you need good surround sound quality, you can buy a sound card. Other than that, I don't see why you would need a network card these days, as motherboards frequently come with 2 (or even 4!) Gigabit Ethernet ports. Likewise, $600 RAID expansion cards.

4. If you're using your single graphics card, what is stopping you from using the other slots? If you're running triple SLI (which you seem to hate with a passion), fair enough, most (or all) of the slots will be blocked. But since you aren't, there is no reason for you not to use the

DON'T GIVE UP
Not all Linux newbies are having troubles. Look a little deeper and you'll soon find it's not that hard...



HAPPY LINUX NEWBIE

In response to the Linux frustrations expressed by new Linux users at various times in *APC*, I empathise with people frustrated with learning Linux, but felt it important to state that I am a Linux newbie (about a year), who is very happy with the switch. I also still use Windows and think it is a great OS. Believe me, I've had, and still do have, frustrating moments with Linux, but the more I learn, the easier it gets and Linux distros get easier to use each year. I would recommend trying Linux from a Live CD, setting up a dual-boot system or installing on another hard drive/flash disk. All of these options will not "nuke" an existing setup. Virtual Linux and Windows installs are another option.

Brad Herdson
Camden, NSW

other available x16 slots for x1 cards, and legacy PCI slots for older devices.

Sean Murphy
Gin Gin, Qld

PHP TAG

I would like to "nitpick" at Akash's article about RSS feeds in PHP. The PHP short tag (<?=) should never be used. While it is a nice short cut, on server configurations with short tags disabled, it will not work. It is always best to use the full PHP start tag (<?php) as it will always work. Also, since *APC* is providing an introduction into PHP through this article, it will save the reader scratching their head for hours wondering why it isn't working (the default "recommended" PHP configuration disables short tags).

Hanson Wong
Balwyn North, Vic

MASTER BOOT SAVE

On page 80 of your December issue, you give a tip about using the dd command to save the MBR (master boot record), which I wouldn't recommend.

Just to be sure what we're talking about here, sector 0 on a hard drive contains two different things: one is the initial boot loader, the other is the partition table for the disk.

The partition table is vitally important and worth backing up. The boot loader code is not so important, as it can be easily reinstalled (eg. with the "install" command in GRUB).

Backing up the two in one file could lead to confusion: for instance, you might have changed the boot settings since the backup, but doing the restore ends up putting back obsolete boot settings, possibly even trying to load up an OS install that has long been wiped, thereby leaving your machine in an unbootable state.

For this reason, I would recommend backing up the partition table, and only the partition table, using a command like this:

```
sfdisk -d /dev/sda >sda.par
```

The "sfdisk -d" command writes a dump of the partition table in an easily-restored format. The ">" character redirects this dump to a named file, in this case "sda.par".

Restoring the partition table, in the event it should get corrupted, is equally easy:

```
sfdisk <sda.par
```

This only overwrites the partition table, it doesn't touch the boot loader code. For more details about sfdisk, see the man page ("man sfdisk").

Lawrence D'Oliveiro
Hamilton, New Zealand

apc

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24 enduser

FROM THE READERS OF APC

apcenduser@acpmagazines.com.au

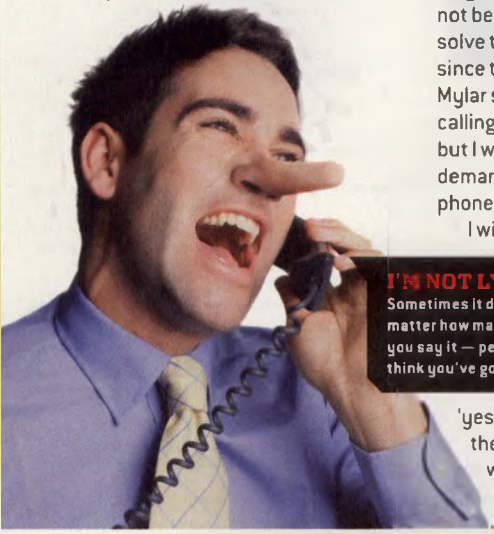
Do you work in the IT industry and are forced to deal with inept and clueless end users on a daily basis? If you have an interesting or amusing story, email us at apcenduser@acpmagazines.com.au. All correspondence becomes the property of *APC* and is subject to editing. Letters must include writer's full name, street address, suburb, state and phone number to be considered for print publication and to be in the running for prizes. Address and phone details will not be published.

Not a liar, just not correct

Jonathon Warren is a computer and printer technician from South Melbourne who says he keeps a record of "all the times that HP stuff up when I log a job with them in regards to warranty servicing."

He sent us records of various exchanges with HP tech support, but this one takes the cake. In this job, Warren believed a customer's printer had a problem with a fuser (the part of a printer that melts toner) and was attempting to convey this to HP. Names and job numbers involved in the exchanges below have been changed for privacy:

01SEP08 After I troubleshot the printer to make sure that the problem was a fuser and not the Mylar strip or any other issue, I called HP at about 16:40 and logged an issue with them regarding the printer. I was advised that a product specialist would call back to troubleshoot further. At about 17:10, Adam from HP called back and asked about the problem. I explained that the issue was with the printer's fuser. He then demanded that I give him the site contact details, claiming my diagnosis was wrong and that I was not being honest. He said he would solve the issue over the phone, since the problem was with the Mylar strip. I then asked if he was calling me a liar and he said no, but I was not correct and again demanded that I provide the site phone number.



I'M NOT LYING!
Sometimes it doesn't matter how many times you say it — people still think you've got it wrong...

I will admit that I got a little angry about being called a liar and I asked if this was being recorded and the answer was 'yes', so I told him I would provide the site phone number if he would say that he was calling me a liar.

He denied calling me a liar but said that I was not correct, so I thanked him for calling me a liar, told him I didn't appreciate being referred to in that manner and then provided the site number that he requested.

04SEP08 Received a call from the customer that the HP technician has not attended and after calling HP I have found out that HP have sent the technician to the wrong address, to a location in Moorabbin, Victoria, instead of the correct address in Gosford, NSW. The Moorabbin location was a Salvation Army office. I have called HP and asked to reopen the case with the assistance of Adam (from the previous day) and he has stated that the serial number was given to them wrong (referring to me as a liar again), and Job has been re-logged as 2602 xxx xxx.

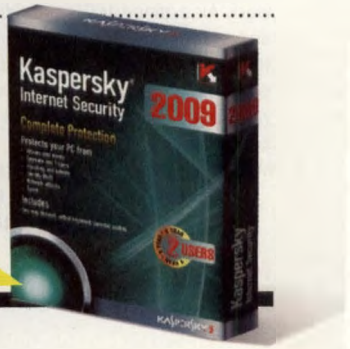
I will have to follow up on 05SEP08 in the afternoon.

JOB: R263949 XXXX Rick from HP would not listen when I said we had been able to troubleshoot the issue (and it just needed fixing now), saying he would not send a technician out without doing all the troubleshooting again. This took three days to log.

JOB: R264618 XXXX HP was called and job logged on 25SEP08 at about 16:30. Dean from HP called back on 26SEP08 at about 09:15 and was told again what the problem with the printer was. He then stated that the technician would not go out today as per the warranty agreement but on Monday. The job may have been logged on Thursday, but HP have pulled rank and said that they will not attend as they are logging the job as of now and will go on Monday 29SEP08". Eventually Warren got the printer fixed. We don't have space for his many other exchanges with HP on other jobs. APC

WINNERS GET THIS

Kaspersky Internet Security 2009 for 3 PC's (packaged in a retail box) includes intelligent application management and control tools, proactive protection from unknown threats, automatic disabling of links to malware sites and even scans operating systems and applications for vulnerabilities. The software also provides a range of identity theft and content filtering applications designed to ensure users remain protected online. This prize is a one year subscription valued at $99.95 www.kaspersky.com.au.



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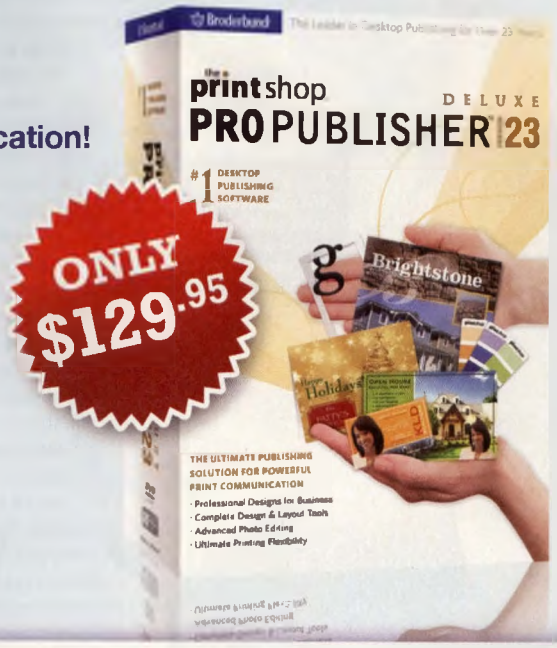

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watchdog

KEEPING AN EYE ON VENDORS!

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Feature bloat angers developer

In a classic case of customer and web developer not communicating, a web project goes wrong. But in the end, fault lays with both sides.

IT'S NOT MY FAULT
They just keep on adding more stuff so I have to do it over and over and over again. Why wouldn't I be angry?

On the recommendation of a developer friend last year I found a web development team based in India who promised to build a full database-driven e-commerce web site using PHP and MySQL for $1,000. Its key selling point was that it would build the site exactly according to my specifications, from the layout and navigation to a product catalogue and customer relationship management system.

So I got onto the web developers and spoke to a Mr Powar, and he seemed really keen for the business and was amazed and thankful that I'd found him from Australia. Mr Powar asked me to send him my specs for the site and generally was very impressive in outlining how the web building process would work. I telegraphed him part of the money and we got started. But if a project highlights all that can go wrong with web development, this was it. The warning signs were there from the start. Firstly, when discussing the specs, Mr Powar kept assuring me he could build anything. "User alerts? No problem." "Email newsletters? No problem."

But when the first prototype was ready there were lots of minor functionalities missing and I realised he'd been very careful to build only what was physically written out on the spec sheet I'd sent him, where I'd simply listed items I wanted without giving him highly detailed information of exactly how each element would work for the user, assuming that as a developer he'd fill in the obvious blanks. When I protested, he argued that I should have been clearer with my spec. He said that the developer working on the site would be "very angry" at having to go back and redo some of the work he'd already completed. He told me that his developer had a short fuse and had to be handled carefully.

So the project was well beyond the launch deadline, and every time I complained, he said the constant "feature bloat" was delaying the project and giving the other developer fits of rage. So in order to get a site out, I agreed to significant cuts in the original web specifications. So, ultimately, I got something that works, to give him credit, but has 1/3 of the original spec and is really no good to me. Is there any hope I can get more of it built?

John Wilson

Watchdog managed to contact Mr Powar and found that the Indian outsourcing aspect to the arrangement was irrelevant. This was a classic web development screwup, where both customer and developer did not communicate as well as they should have at the beginning.

Dear Watchdog,

I understand that the customer is angry, but we built the customer's site in good faith according to the site specifications he gave us. The customer didn't know he wanted things until after he saw what we had built. I would show him a functionality as listed in his original spec and he would then say: "Oh, I thought it would also do this, and that. Why haven't you built it?" And I would tell him it was not in his original spec and it was not possible for us to second-guess him. The customer also pretended to know more about the web than he did, so when I explained how things on the site would work, he would agree, only to reveal later that he had no clue. As for my developer being "angry", that is true, but any developer who is constantly asked by his manager to change his work will get feelings of hatred. I believe that, in the end, we gave the customer more than he wanted, so I am sorry he is still unhappy.

Ranjeet Powar
Managing Director, Excellentdev

Mr Powar sent us Mr Wilson's original web site specs, and Mr Wilson did confirm that these were built, so Mr Wilson can't expect more. But it's clear that Mr Powar worked to the letter of the law, rather than the spirit, and that Mr Wilson was naive in assuming things which he had not articulated in the spec would be delivered.

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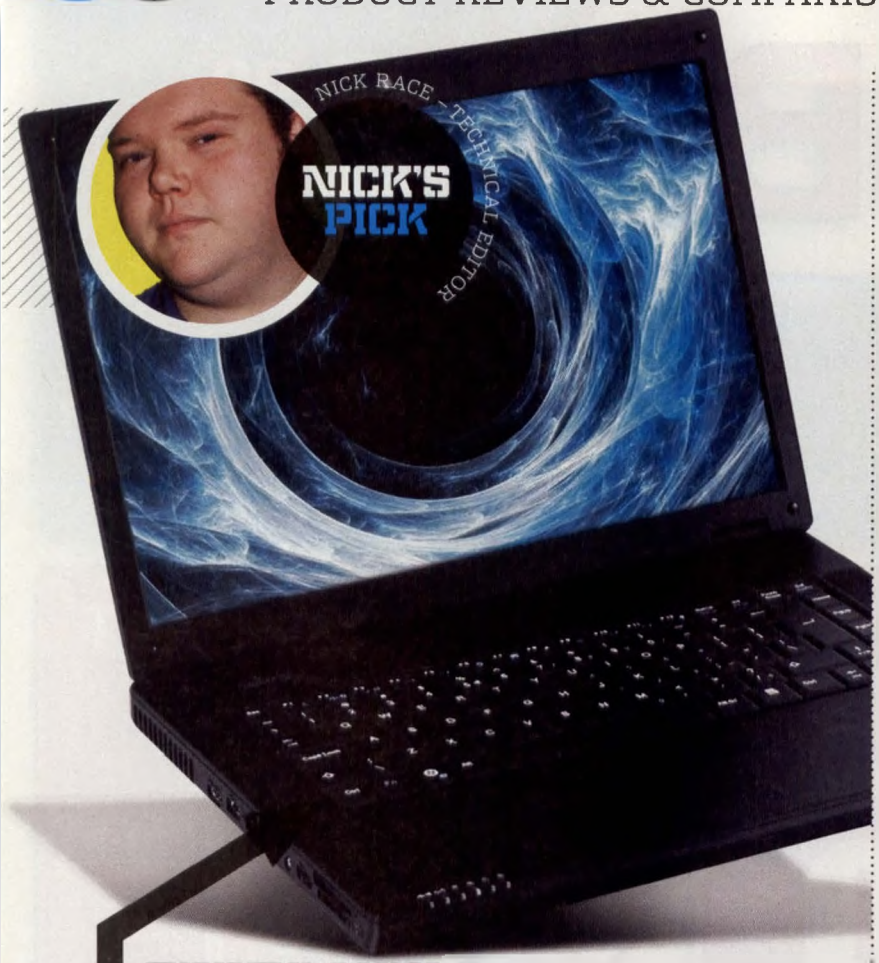
PRODUCT REVIEWS & COMPARISON



ZEPTO NOX A15

It seems that with all the hoopla around netbooks and desktop replacement notebooks, the good old middle ground is being played down by many manufacturers. A good mid-size, reasonably powerful notebook is becoming increasingly rare. That's why it's refreshing to see this no-nonsense, powerful all rounder notebook from Zepto.

PERFORMANCE ✪✪✪✪✪

A 7,200rpm hard disk drive makes it as snappy as a desktop and the Core 2 Duo processor and 4GB of RAM make a mockery of netbook performance. The NVIDIA 9600M GT is good enough for a spot of gaming if the mood takes you.

PRICE ✪✪✪✪

At over $3,000, this isn't the cheapest notebook around, but there's plenty of value for your dollar. Performance is on top, the construction is sturdy and it's likely to last for the long haul in to Windows 7 and beyond.

SETUP ✪✪✪✪

802.11N b/g/n networking, HDMI and Gigabit Ethernet, a high res screen, biometric fingerprint scanner and webcam are bells and whistles du jour. It's not all wine and roses however, the screen needs a better viewing angle.

ROUND-UP

BEST CHOICE NETBOOKS

Since the Eee PC's arrival, netbooks have grown in popularity. APC looks at what's available for the mobile geek.

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The Harman/Kardon speakers pump out exceptional sound quality for a laptop.

Awesome HTPC capabilities in a laptop form, but where's the Blu-ray drive?

7/10

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$2,799

Massive, gorgeous screen; decent hardware. ✔

The Cell doesn't really do a lot; where's the HD optical drive? ✖

SPECIAL FEATURES
18.4in screen
Harman/Kardon speakers
Cell processor
Gesture control

To say we were a little bit excited about playing with the Toshiba G50 is like saying a weekend in Vegas can be a little bit of fun. With its Cell processor promising to deliver a HD video revolution, we had high hopes for the G50.

It's a true multimedia laptop and has the billboard sized screen to prove it. At 18.4in, we confess that this is the largest laptop screen we've ever seen. With a stunningly crisp 1,980 x 1,020 resolution, watching a variety of DVDs proved that it's an exceptionally high-quality screen. The three Harman/Kardon speakers pump out exceptional sound quality for a laptop. Although, weighing a whopping 5kg, a lithe road warrior the G50 is not.

The Cell processor is a four SPE variant, hence Toshiba billing this as a quad-cored laptop. The first benefit is supposedly higher image quality when playing an HD signal. Unfortunately, this is exceedingly difficult to prove, because Toshiba has not included a Blu-ray drive. Using the integrated digital TV tuner didn't prove the Cell's case either, with the TV signal looking no better (or worse) than other HD tuners we've seen on non-Cell powered machines.

The only other way to test the power of the Cell processor is when mastering DVDs using the Ulead MovieFactory included on the laptop. Unfortunately, we don't have this software to use on our other, Cell-less laptops, so a direct comparison is impossible. To our disappointment, the G50 scored one of the lowest PC Mark TV and Movies scores we've seen, at 2,165. We're quite surprised, considering the other components aren't too shabby. The Core 2 Duo T9400 ticking over at 2.53GHz is a respectable processor, while the NVIDIA GeForce 9600M GT should be more than capable of handling movies. Alongside the CPU and GPU is a hefty amount of memory and storage; 4GB of DDR2 and 640GB of 5,400rpm HD to be exact.

So far the Cell processor hasn't really impressed... a similar story that has been played out by the PS3. But there's one ace up its multi-cored sleeve — gesture control. Harnessing the infinite power of the Cell processor with the razor sharp resolution of the built in webcam, Toshiba has built a laptop that can read your commands with a wave of the hand, or a flick of your finger. Well, that's what the marketing fluff says. In reality, gesture control relies on a uniform background, even lighting and a light north easterly breeze blowing at no more than three miles per hour. In other words, it's infuriating to get consistent results, so use a mouse or the included remote.

Yet despite our misgivings with the Cell processor, there's still a lot to love about the G50. Considering the massive screen real estate, it's pretty good value. The case is gorgeous and rugged, and the speakers actually do a decent job. Even the inclusion of something as simple as IceTV (an Aussie EPG which we're big fans of) makes us realise that Toshiba is onto something with this theatre PC. And then we remember Toshiba's stupid decision not to include a Blu-ray drive, and we shake our heads in dismay, wracked with the pain of what could have been. If and when a Blu-ray-equipped version arrives, the G50 will be a beast to reckoned with... but until then, there are more capable HD multimedia notebooks on the market.

Bennett Ring

9/10

Toshiba Qosmio X300

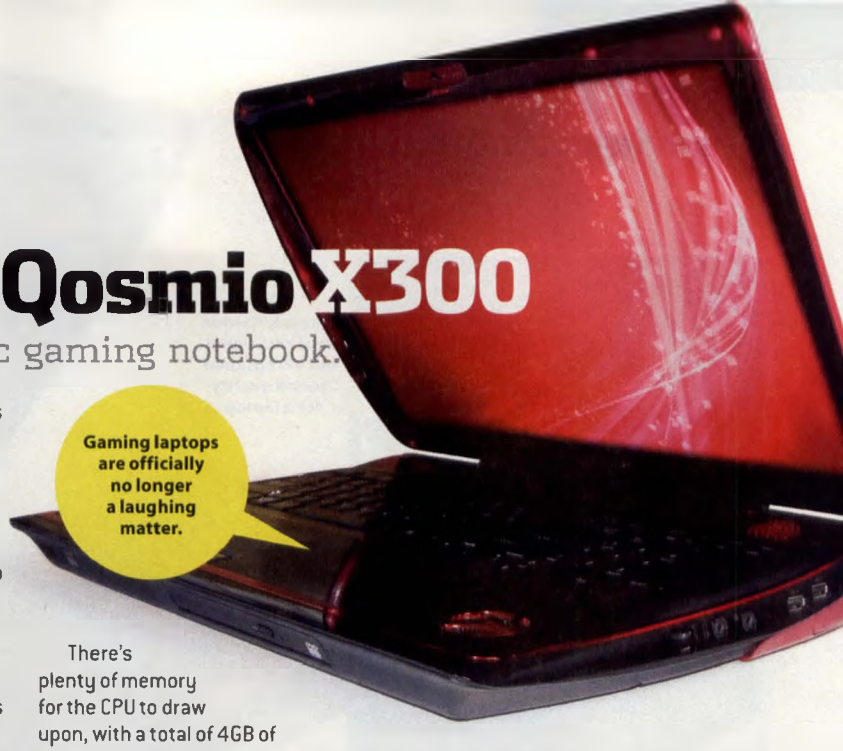
The not-so-pathetic gaming notebook.

Toshiba
www.toshiba.com.au
$3,999

Sexiest case of '09; large, clear screen; super fast GPU.

Rather expensive; touchpad is a bit rubbish.

SPECIAL FEATURES
17in widescreen display
Intel Core 2 Duo T9400 CPU
NVIDIA 9800M GTX



One of the few true gaming notebooks on the market, the X300 is the antithesis of ultra-portable. And, despite the fact that we've previously criticised the concept of gaming notebooks, we absolutely love it. Toshiba has thrown all concessions to portability out the window. The X300 is housed in a case the size of a large concrete slab, and weighing just as much, at 4.2kg.

A wide range of inputs and outputs are included on the case. There is an HDMI out, SP/DIF out, three USB ports a combined USB/eSATA port and a 5-in-1 card reader. Thanks to the massive case, a 17in widescreen display is included. At a resolution of 1,680 x 1,050, it's wonderfully crisp.

At its heart is an Intel Core 2 Duo T9400 CPU, running at 2.53GHz. Upon browsing the BIOS it appears there is no easy way to overclock the processor, which is a shame.

There's plenty of memory for the CPU to draw upon, with a total of 4GB of DDR3 memory helping to explain the X300's high price. Two hard drives are included, but strangely they're not operating in RAID mode.

Finally, what truly separates this gaming notebook from so many wannabes is its insanely fast graphics processor. The NVIDIA 9800M GTX leaves most desktop GPUs choking in its dust. A 3DMark Vantage score of 3,964 shows just how powerful it is, while a PC Mark Vantage score of 3,873 proves that it's just as capable at productivity and multimedia apps.

Some will laugh at how ridiculously big this notebook is, while others will baulk at its even bigger asking price. Now if only we could unlock the full potential of its processor, we'd have a laptop that would rival most gaming desktop PCs in computational power.

Bennett Ring

8/10

Sony VAIO VGN-AW17GUQ

Feature-packed if somewhat bland-looking for a VAIO.

Sony
www.sony.com.au
$3,999

Blu-ray burner/player; 18.4in screen; subwoofer

Screen's viewing angles; price; weight.

SPECIAL FEATURES
Intel Core 2 Duo T9400 CPU
4GB of DDR2 RAM
NVIDIA GeForce Go 9600M GT

In many ways, Sony's giant, 18.4in VAIO VGN-AW17GUQ is a notebook worth admiring and has many quality features with a hell of a lot of power to burn. However, its cost is likely to deter many.

Not all is lost though. It offers some redeeming features such as a Blu-ray burner and DLNA connectivity that set it apart from similar products.

The core hardware is quite juicy, offering a Centrino 2 platform that includes an Intel 45nm Core 2 Duo T9400 2.53GHz CPU with a 1,066MHz FSB and a beefy 6MB L2 cache. It also includes a more-than-adequate 4GB of DDR2 RAM. A Gigabit Ethernet port is installed and a Wi-Fi 802.11a/b/g/n card is included as is an NVIDIA GeForce Go 9600M GT with 512MB of dedicated GDDR3 memory.

Using PCMark Vantage, the Sony VAIO VGN-AW17GUQ scored a run-of-the-mill 3,753. The tables turn when testing the graphics: a score of 1,701 in 3DMark Vantage — a cut above the average.

Included alongside the Blu-ray player is an HDMI port. Sony has used this as a replacement for the standard S-Video.

With its HD 1,920 x 1,080 resolution you're going to see the full 'definition' of that high-def media. Unfortunately, it has poorer vertical viewing angles than we'd have hoped for. On the upside the screen offers extremely vibrant colours. The sound is solid, with a subwoofer to kick in the bass. Given its screen-size, its large keyboard and its larger speakers, the hefty 3.95kg weight is no shock. Running our DVD rundown test drained the Sony in just over an hour.

One feature missing is an eSATA port. Although, there is a swathe of USB ports and a FireWire port. Internally the VAIO VGN-AW17GUQ has a good 640GB of storage spanning two 320GB hard drives.

If you can afford it, it's a powerful and entertainment-filled piece of hardware.

Jesse Sutton

7/10 Zepto Nox A15

The Zepto Nox A15 keeps it real — or, at least, simple.

Zepto Australia
www.zepto.com
$3,260

Great performance; good network options; 7,200rpm 250GB HDD.

Battery life; no eSATA port; no VGA or video output (only HDMI).

SPECIAL FEATURES
Intel Core 2 Duo P9500 CPU
1,066MHz frontside bus
4GB of DDR2 800MHz RAM
NVIDIA GeForce 9600M GT 4

If you're unfamiliar with the Danish brand, that's likely because it's a relatively new player in the Australian market. According to Zepto's own site it is the largest notebook manufacturer in Europe, and it's certainly produced some solid products by our reckoning. Incorporating much of the latest hardware, the Nox A15 is a good performer and is built to last.

Zepto has gone to town with the specifications, offering a top-end 45nm, Intel Core 2 Duo P9500 CPU, running at 2.53GHz on a 1,066MHz frontside bus (FSB) and a 6MB L2 cache. There's also 4GB of DDR2 800MHz RAM with the potential for up to 8GB. This can be upgraded at the time of purchase. Zepto has also thrown in an NVIDIA GeForce 9600M GT with 512MB of GDDR3 memory, providing some decent gaming performance (as far as notebooks go).

Overall we were quite impressed by the performance. In PCMark Vantage, for example, it scored 3,889, which doesn't quite match the recently tested HP HDX X18-1013TX (FZ946PA) on 4,012, despite being a solid score on its own. In 3DMark Vantage it scored 1,455, a notch above its aforementioned nemesis, which only landed 1,233 with the same hardware. The GeForce 9600M GT is not the most powerful notebook GPU available, but it's up there.

A standard DVD RW drive is installed, though a Blu-ray drive is optional, and the 1,680 x 1,050 screen provides a nice high-resolution image, should you wish to watch any high-definition movies, Blu-ray or not. We're happy enough with the brightness and contrast of the 15.4in screen, and the viewing angle is reasonable, if not perfect. Tilting the screen soon distorts the image from the viewer's perspective. It's not the worst we've seen, but it could be better.

The speakers produce plenty of volume and reasonable quality audio for a notebook. A distinct lack of bass is the main problem, leaving the sound a little thin. However, this problem exists in the vast majority of notebooks.

In the last 12 months eSATA has gone from being a bonus to a regular, and the Zepto Nox A15's lack of eSATA is a little disappointing, especially considering it's a high-end model. eSATA may not be on everyone's list of needs, but if you already own some eSATA external hard drives, bear this in mind. As far as internal storage goes, the Nox A15 offers a 250GB 7,200rpm drive, which is a cut above the standard 5,400rpm models usually found in notebooks and is worth a nod of recognition.

Other features worth noting are the Nox A15's webcam, biometric fingerprint scanner and HDMI port. Biometric fingerprint scanners may not be as necessary in notebooks of this nature, but any added security should be welcomed. HDMI is almost essential these days, as S-Video is becoming obsolete. Still, we would have liked an S-Video port, and the lack of a VGA output is baffling.

On the up side, the Nox A15 offers some good networking, with Gigabit Ethernet and Intel's latest Wi-Fi 533AN Shirley Peak b/g/n wireless card. It offers a theoretical maximum of 450Mbit/s on the N standard, rather than the current 300Mbit/s wireless cards. This will require a router that also supports the speeds, and again is an optional extra, so you can opt for the regular card and save some cash.

While the Nox A15 is a power user's notebook, and shouldn't be expected to have the most impressive battery life, we were quite happy with the results of our DVD run-down, in which the Nox A15 lasted a good two hours and 15 minutes. Our model included a 9-cell battery at extra cost, so consider this when opting to upgrade or not. This test is considered a worst-case scenario of sorts, due to the high strain on the battery, and subsequently you should expect to see longer battery life under normal circumstances.

Jesse Sutton

Zepto has gone to town with the specifications, for the benefit of the power user.

Awesome camera and a friendly interface in this smartphone-lite.

APC MAGAZINE HIGHLY RECOMMENDED

LG
www.lg.com.au
$700

Superb camera; intuitive user interface; excellent multimedia performance.

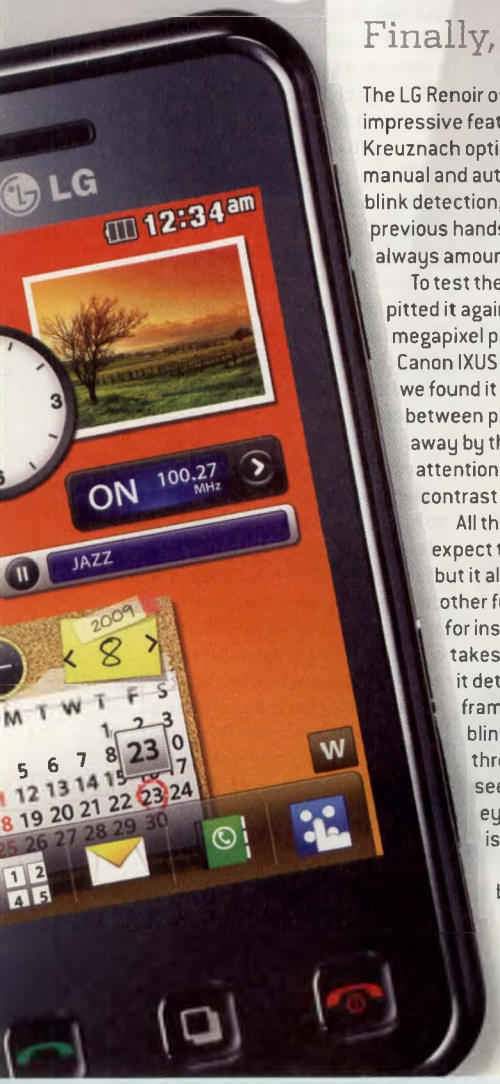
Limited on-board storage; memory errors.

SPECIAL FEATURES
Schneider-Kreuznach optics
Xenon flash
Manual and auto-focus
Smile and blink detection

8/10

LG Renoir KC910

Finally, a camera-phone that rivals a camera.



The LG Renoir offers a bundle of impressive features like Schneider-Kreuznach optics, a Xenon flash, manual and auto focus, smile shot and blink detection, but, as we've seen in previous handsets, such things don't always amount to better photos.

To test the Renoir's camera, we pitted it against a budget eight-megapixel point-and-shoot, the Canon IXUS 80IS. For the most part, we found it hard to distinguish between photos and were blown away by the Renoir's razor sharp attention to detail and excellent contrast and exposure.

All the usual features you'd expect to find are on-board, but it also throws in a few other functions. Smile shot, for instance, automatically takes a photo as soon as it detects a person in the frame smiling. There's also blink detection, which throws up a warning if it sees someone close their eyes while the photo is taken.

We did run into a few bugs: turning the red eye reduction flash on would consistently crash the phone, and whenever the camera application would switch off, restarting it would launch it in video mode.

So, what's the rest of the phone like? Pretty darn good, actually. It's not strictly a smartphone per se, but it's got many of the same trappings as one. On the hardware side, the Renoir looks similar to the iPhone 3G, with a three-inch touchscreen, but it's smaller and thicker.

The WQVGA 262K-colour screen is responsive, with haptic feedback, and an accelerometer automatically switches the orientation to landscape in certain applications. There's no keypad: all input takes place through the touchscreen.

If you've struggled with complex smartphone operating systems before, you'll love the Renoir's refreshingly simple menu system. Like the Samsung Omnia, you can drag and drop widgets onto the home screen, including a calendar, music player, memo pad and weather.

Multimedia playback is another strong point, with support for lots of different audio and video codecs (including DivX and XviD), FM Radio and TV Out. The Renoir is the first phone to include Dolby Mobile, which offers surround sound (over connected headphones), superior bass and many other features.

For wireless communications, the Renoir is as ably equipped as any smartphone, with tri-band GSM, dual-band 7.2Mbit/s HSDPA, 802.11b/g Wi-Fi and Bluetooth. It's also got A-GPS for satellite navigation. For web browsing, there's a full HTML web browser.

The email client offers the full set of features like viewing file attachments, signatures and automatic retrieval, but we encountered a lot of memory errors when trying to open large emails and file attachments.

The Renoir has a replaceable 1,000mAh Lithium Ion battery that's quoted for 3.6 hours of talk time and 14.5 days (or 350 hours) of standby time. We were able to get over a day's worth of heavy testing out of it, so in practice you should be able to squeeze in around two days of standard usage.

The phone's main shortcoming is the paltry on-board storage: 100MB. You can supplement this with a microSD card, but that won't help with the memory errors we encountered while web browsing and emailing.

Jenneth Orantia

Sony Ericsson XPERIA X1

G 10

Lots to like, but not too much to get really excited about.

Sony Ericsson
www.sonyericsson.com.au
$1,499

✔ Extended service offer; versatile panels interface; high-res screen; excellent QWERTY keyboard.

✖ Expensive; busy control pad area; average battery life.

SPECIAL FEATURES
Panels function
Tri-band 7.2Mbit/s HSDPA
802.11b/g Wi-Fi
GPS
Bluetooth 2.0

One of the standout features of the XPERIA X1 is the 'panels' feature interface – an application layer that sits on top of Windows Mobile 6.1 Professional: which lets you completely change the look and feel of the home screen with a couple of clicks.

Up to nine panels can be loaded at a time, accessed by pressing a dedicated hardware button on the X1's face. Other panels include a Google panel, FM radio panel and Sony Ericsson widget panel, and more can be downloaded from the Sony Ericsson web site. That aside, the X1 is pretty standard as far as Windows Mobile smartphones go. The usual productivity, internet and multimedia applications that come with the operating system are on board, and Sony Ericsson has also thrown in the excellent Opera Mobile 9.5 web browser, Google Maps and a task manager for managing open applications from the Today screen.

The fact that it's got tri-band 7.2Mbit/s HSDPA, 802.11b/g Wi-Fi, A-GPS and Bluetooth 2.0 isn't enough to get us hot under the collar anymore, but it's good to see Sony Ericsson hasn't omitted any of the essentials. Of more interest is the X1's hardware design. It's similar to the HTC Touch Pro, with a large touchscreen on the front and a full QWERTY keyboard, but there are subtle differences that make the X1 stand out. For one, the screen is slightly larger at three inches, and it has a resolution of 800 x 480: the highest we've seen yet on a smartphone.

It also has more buttons on the front: two soft keys that correspond to the on-screen menus, call buttons, the panel and OK button, and a five-way navigation pad with a centre key that doubles as a touchpad. The upside of this busy control area is that you don't have to use the stylus and touchscreen as much, but it's cramped.

The call buttons in particular have been shunted off to the sides and aren't as easy to press as the other keys. The keyboard buttons are small but comfortably-spaced, with generously-sized space bar, Enter and punctuation keys.

From a multimedia standpoint, the X1 is above average, offering 3.2-megapixel camera (with auto-focus, flash and video recording), FM radio, a 3.5mm earphone jack (take that Touch Pro!), and a decent external speaker. There's 512MB of memory on-board, and a microSD card slot for adding more memory (a 4GB microSD card comes standard in the box).

The X1 backs this boatload of functionality up with some serious horsepower in the engine room: a 528MHz Qualcomm MSM7200 processor, 256MB of ROM and a 1,500mAh Li-Polymer battery. Battery life is quoted as six hours of talk time and 640 hours (or 26 days) of standby time; in practice, we only got around a day's worth of medium-to-heavy use.

To help justify the $1,499 asking price, Sony Ericsson includes an extended service offer with the phone: a support number that puts you through to a specialised team, and a couriered replacement if your phone stops functioning in the first 12 months.

Jenneth Orantia

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M903APC

Gainward 9800 GTX+ 512MB

6/10

Performs well, but are there better options?

Gainward
www.gainward.com
$299

Good price; decent performance; Vantage Key.

Not that exciting; better options out there.

SPECIAL FEATURES
Core bump to 745MHz
Dual-molex to 6-pin PCI Express connector
DVI to HDMI connector
S/PDIF loop-back cable

Gainward, while being very large in Europe, has been a bit up and down in Australia over the last few years. For most of its life, Gainward has been an NVIDIA-only partner, but a while ago Palit picked the company up and has since extended its line, which now also includes ATI-based graphics cards.

While carrying ATI graphics cards, the particular model we're looking at today is based off the popular 9800 series of cards from NVIDIA. Gainward has two 9800 GTX+ cards on the market at the moment, a stock one like what we see from most companies and the one we have today which carries with it an aftermarket cooling solution. Also included with this model is a slight core bump to 745MHz while the 512MB of GDDR3 memory remains at the stock 2,200MHz DDR clock.

Looking inside the package, we have a driver CD and manual alongside a piece of paper which gives us a key to register 3DMark Vantage. A copy of the benchmarking software isn't included, though, so if you want to make use of it you will have to download it from the FutureMark web site. Apart from the paperwork and driver CD, we have a dual-molex to 6-pin PCI Express connector, DVI to VGA connector, DVI to HDMI connector and an S/PDIF loop-back cable so that you can get audio through the HDMI convertor.

Looking at the performance side of things, the Gainward offering is slightly faster than a stock clocked 9800 GTX+ with only very small gains being seen due to the core having a mild increase in speed. Unfortunately, the 9800 GTX+ has never really stood out due to the fact that it isn't much more of a card than an overclocked 9800 GTX, which has been out for a while now.

The good news is that the 9800 GTX+ does ultimately offer some pretty good value for money. If you find yourself looking for a good-value higher-end NVIDIA graphics card, the Gainward 9800 GTX+ isn't a bad option; the only problem is it's not really the best option.

Shane Baxtor

Force3D HD 4870 Black Edition

7/10

A strong performer.

Force3D
www.force3d.com
$429

Great cooling; good performance.

Cooler takes up over two slots; limited bundle.

SPECIAL FEATURES
Core bump to 770MHz
3,800MHz data rate

With so many graphics card companies out there it's impossible to know them all. It's not until a company releases a product that stands out from the pack that it really begins to get noticed. Cue Force3D and its HD 4870 Black Edition.

Upon pulling the card out of the package, the first thing you notice is the massive cooler which incorporates two fans. With the help of the new cooler, Force3D has overclocked the card; the core has been increased from 750MHz to 770MHz, while the 512MB of GDDR5 memory has gone from 900MHz to 950MHz, which equates to a 3,800MHz data rate.

Apart from the card there isn't a whole lot going on inside the box. Along with the standard manual and driver CD we have an S-Video to RCA dongle, S-Video to Component dongle, DVI to VGA connector, DVI to HDMI connector and a CrossFire bridge in the event you want to put two of these cards together.

Performance doesn't hold too many surprises; performing just above a standard HD 4870. Having a look at the cooler again, it was nice to see just how efficient it was by dropping temps down 10c when compared to a stock cooler, while also offering roughly the same noise levels.

The graphics card market is extremely tough these days but Force3D has done a nice job with the HD 4870 by making it stand out from others. While it would have been nicer to have seen a bit more going on in the bundle, if you're looking for a card that cools exceptionally well and offers that great HD 4870 performance, the Black Edition from Force3D is going to be quite the contender.

Shane Baxtor

9 10

Altech NRG Game Ultra

If TV's Top Gear did computers, then this would be on it.

Altech
www.altech.com.au/nrg
$4,999

Hugely powerful 3D. ✔

Noisy; not cheap; poor 2D performance. ✖

SPECIAL FEATURES *i*
- Antec Twelve Hundred case
- Alphacool system
- Two Radeon HD 4870 X2s
- Phenom II 940 CPU

We like Altech. In a world of rather dull PCs which use well-thought-out combinations of price and power to give a high-value system, this Australian tech Empire produces massive PCs that aren't quiet, cost a fortune but go like the clappers.

This NRG comes in a monolithic Antec Twelve Hundred case, replete with 200mm top fan, three 120mm front fans, a 120mm side fan, two more on the rear and a fan stuck on a bendy arm to cool the motherboard's chipset. The only thing without a fan is, of all things, the CPU, which is water-cooled with an Alphacool system. The fans are all backlit with blue while the water-cooling pipes are green. It all looks pretty immense from the side window. Not surprisingly this isn't the quietest system we've ever heard: there's a constant whoosh, which escalates under load.

But the cooling is there for a reason. Two Radeon HD 4870 X2 graphics cards are installed in CrossFire and these things get very hot indeed. Each card has 1GB of GDDR5 RAM and together scored an almighty 3DMark Vantage score of 16,058. The system also has two 1TB Samsung hard disks running in RAID 0 and 4GB of Corsair Dominator DDR2 RAM. But the real story is the brand-new Phenom II processor. Altech uses the 940 variant (with an unlocked multiplier), which runs at 3GHz stock and overclocks it to 3.7GHz. The motherboard used is a DFI LP DK 790FXB-M2RS, so the settings are there for further overclocking.

The Phenom II is AMD's new quad-core chip, fabricated using the 45nm process, and with an unlocked multiplier. It uses the 940-pin AM2+ socket and sticks with DDR2 RAM. It's all about rivalling mid-range Intel processors but for less money. However, on this evidence we're not so sure. It only scored 6,365 in PCMark Vantage, which is less than a budget Core i7 920 system running at stock.

Making sure everything runs stably is an Antec 1,000W PSU. Despite all of the components, it's still possible to access two PCI slots and the third PCI-E x16 slot. You could also add two more DIMMs and four more hard disks. If you wanted to add a second optical drive you'd be in trouble. While there is already an installed Blu-ray writer, you'll have to overhaul the innards to add another, as the two main slots are taken up with the water-cooling radiator, plus a rather-nifty status LCD which monitors system performance.

Connectivity is good, with two USB ports, eSATA and two audio jacks at the top on the front. At the back are six audio jacks, six USB ports, a single gigabit Ethernet socket, plus optical and coaxial audio out. However, there's no FireWire and the warranty is a rather disappointing one-year return to base.

It's expensive but feature-packed and great for gaming. However, people paying this much should really be looking for Core i7-based monster systems, as they go even faster: even with low-end chips. Unless you just want the immense gaming power, paying this much for potential 2D performance is something only Intel-hating overclockers would do.

Nick Ross

PHENOM II

Does the Phenom II signify the rebirth of AMD in the modern CPU era? We torture the latest from AMD and pit it against past and present.

Throughout the last generation of AMD CPUs, one of the biggest complaints when comparing against Intel's Core architectures (Kentsfield and Yorkfield-based quad-core processors, for example) is the lack of on-die cache available for the processor. This is necessary for quick memory access in cache-intensive applications. These apps generally relate to sizeable CPU-based number crunching with short, quick threads to process (preferably over a short pipeline). Such applications include the likes of Super Pi as a synthetic test and gaming as a real-world influence.

Not surprisingly, Intel's architecture with a comparatively huge cache and very efficient pipeline left the original Phenom processor for dead. Phenom saw diminished capability in comparison across many areas of specific interest such as number crunching (Super Pi, Pi Fast etc.) and gaming (3DMark 06 for example would see a 2,000-4,000 score difference). Now add to the mix the fact that the Intel architectures were offering much higher and easier scalability (read: they overclocked like crazy!), it left many people wondering why they would need an AMD processor instead of an Intel offering.

Well, we can all thank our lucky stars because there is a glimmer of hope for AMD. And this glimmer of hope is the Phenom II processor. With fine architectural tuning, a renewed focus on scalability and a sizeable increase in cache size, the Phenom II processor has given hope to AMD in what could be described by many as one of its darkest hours. The biggest difference between the Deneb-core based Phenom II and its older brother, the Agena core-based Phenom, is the sizeable increase in L3 cache density.

Now sporting 6MB of L3 cache — three times more than the 2MB found in the Agena-based Phenom processors — and with scalability like never before seen on any AMD platform, AMD went one step further and even conquered a frustrating issue for hardcore enthusiasts: the AMD Cold Bug.

With the ability to now run down to temperatures of a staggering -186°C and requiring more than liquid nitrogen to go any further (anyone got any liquid helium available?), the company has put together something to, if not do anything else, inspire people that AMD is not done just yet.

While for many of us we'll only be running the stock air cooler or a third party air heatsink at best, even under these conditions the overclocking scalability is phenomenal (excuse the pun — we've wanted to use this one for a long time; at least in a positive light). If you've already looked at the results table you'll have noticed that we ran all tests at a strong 3.75GHz. This was completely stable and, not only that, it is towards the lower end of the air scalability, with many overclockers getting up towards the 4GHz mark with stable operating conditions (note: this is due to the old saying 'your mileage may vary', as it relates very poignantly to the art of overclocking).

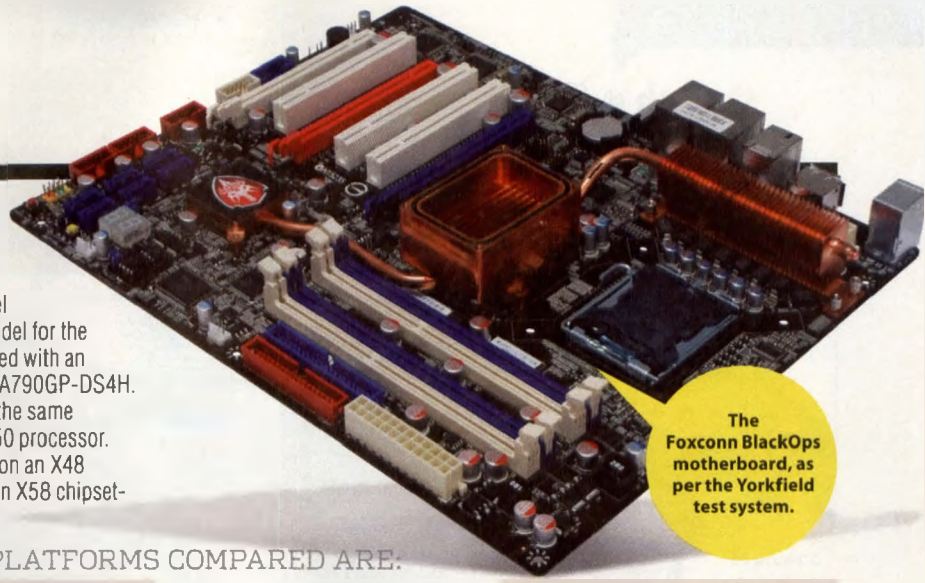
The Phenom II processor range also completes the new Dragon platform. With Spider now showing its age (Phenom + 790FX + HD3800-series = Spider), the Phenom II processor line is the last piece of the puzzle. But what makes up the Dragon platform? The Dragon platform consists of a Phenom II processor, 7-series chipset — specifically, the 790GX chipset — and a HD4800-series GPU to round it out. With some general information now known, lets go on to examine the comparative benchmark results.

But before we do jump into the

WHAT WE TESTED WITH

THE MODERN ENTHUSIAST PLATFORMS

For testing, we've put together four high-end enthusiast level platforms. The first is based on the recently released top model for the Phenom II processor line, the Phenom II X4 940, and is paired with an AMD 790GX chipset-based motherboard, the GIGABYTE MA790GP-DS4H. The second is the previous generation from AMD based on the same motherboard platform but instead using the Phenom X4 9950 processor. For comparative testing we used a Core 2 Extreme QX9770 on an X48 chipset-based motherboard and a Core i7 965 Extreme on an X58 chipset-based motherboard.



The Foxconn BlackOps motherboard, as per the Yorkfield test system.

THE FULL SPECIFICATIONS OF THE PLATFORMS COMPARED ARE:

1 DENEB TEST SYSTEM

Processor: AMD Phenom II X4 940 Black Edition

Motherboard: GIGABYTE MA790GP-DS4H

Memory: Corsair Dominator @ DDR2-800 5-5-5-18 2T and DDR2-1000 4-4-4-12 2T 2GB (2 x 1GB)

Graphics: GIGABYTE HD4870 1,024MB

Power Supply: Silverstone OP1000 / Corsair TX750

Storage: Intel X25-M SSD

2 AGENA TEST SYSTEM

Processor: AMD Phenom X4 9950 Black Edition

Motherboard: GIGABYTE MA790GP-DS4H

Memory: Corsair Dominator @ DDR2-800 5-5-5-18 2T and DDR2-1000 4-4-4-12 2GB (2 x 1GB)

Graphics: GIGABYTE HD4870 1,024MB

Power Supply: Silverstone OP 1000 / Corsair TX750

Storage: Intel X25-M SSD

3 NEHALEM TEST SYSTEM

CPU: Core i7 965 Extreme Edition

Motherboard: ASUS P6T Deluxe LGA1366 Platform

Memory: Corsair Dominator @ DDR3-1600 8-8-8-24 1T 6GB (3 x 2GB)

Graphics: GIGABYTE HD4870 1,024MB

Power Supply: Silverstone OP1000 PSU

Storage: Intel X25-M SSD

4 YORKFIELD TEST SYSTEM

CPU: Core 2 Extreme QX9770

Motherboard: Foxconn BlackOps 1600 1333/1066/800 MHz

Memory: Corsair Dominator @ DDR3-1600 7-7-7-21 2T 2GB (2 x 1GB)

Graphics: GIGABYTE HD4870 1,024MB

Power Supply: Thermaltake Tough Power 1200

Storage: Intel X25-M SSD

fray, there's one significant point to acknowledge; the Phenom II X4 940 Black Edition can be had for between $399-$419 at retail (around $350 for the 920). This means, a full Dragon platform with a Phenom II X4 940 Black Edition 790GX-based motherboard (eg. GIGABYTE MA790GP-DS4H), 4GB of DDR2-1066 Corsair Dominator memory and an HD4850 GPU can be had for around $1,100.

In this review, the processor and platform as a whole is compared to processors and platforms from Intel with similar 'top model' appeal (ie. unlocked multiplier), and just the processors cost more than a complete 'Dragon' platform. A rather powerful piece of food for thought — now let's get into it.

OS, SOFTWARE AND BENCHMARKS

Each system was formatted with Windows Vista 64-bit and patched with all relevant updates. For testing, the Catalyst 8.12 drivers (latest available at time of testing) were used for all 3D-related tests. No performance influencing tweaks were made to any installs to assure not only an equal comparison between the two units tested but also for simple comparison with other Windows Vista 64-bit platforms you may own or have access to. We used a range of synthetic and real-world benchmarks to ascertain the performance differences between the two platforms. The following benchmarks were run:

- PCMark Vantage 64-bit
- 3DMark Vantage
- 3DMark 06
- wPrime
- Cinebench 64-bit
- Crysis 64-bit
- WinRAR
- Everest Memory Bandwidth

PCMARK VANTAGE 64-BIT

Clock for clock the Phenom II X4 processor actually out-performs the Yorkfield architecture of the Intel Core 2 Quad processors. And it does nothing short of destroying the aged Agena-based Phenom processors. But on the note of destruction, the Core i7 simply lays waste to everything in its path.

Particular areas worth noting: the Phenom II X4 processor's strength in PCMark Vantage 64-bit is in the Communications and Productivity sub tests. These are areas predominantly influenced by high throughput and efficient memory bandwidth; something that AMD designs have been known for. But again, if you look across the board you'll see that even in this area of influence the Core i7 is pure destruction.

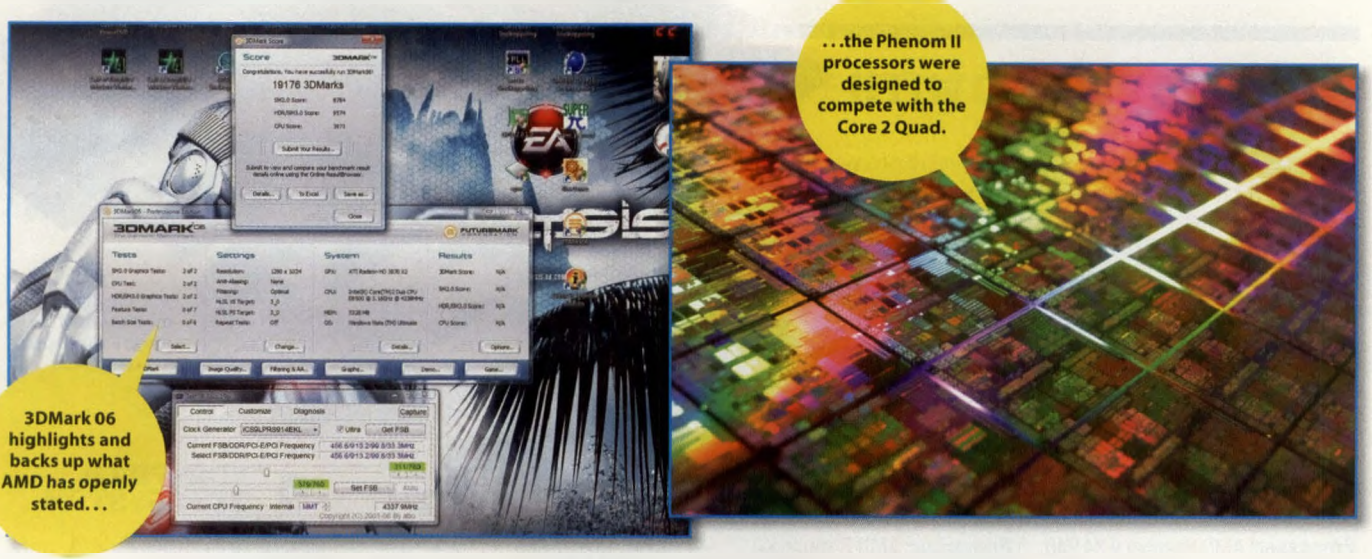
3DMARK VANTAGE

A benchmark heavily influenced by cache density, it comes as no surprise that we see a significant boost in the score over the older Agena/Phenom design.

Unfortunately for AMD, this also means that it still gets its rear handed to it on a silver platter by both the Yorkfield and Bloomfield CPU designs. Thankfully we do at least see an improvement on previous generations and a push in the right direction. Also, if we take note of actual gameplay performance in Crysis, the 6MB of cache does appear to be sufficient for real-world gaming.

3DMARK 06

The 3DMark 06 results highlight the increase in performance due to the increased cache (6MB L3 instead of 2MB L3 on the older chips). This also puts them within sniffing distance clock for clock with the Yorkfield Core 2 Quad processors from Intel. This highlights and backs up what AMD has openly stated; the Phenom II processors were designed to compete with the Core 2 Quad processors. Not the Core i7


3DMark 06 highlights and backs up what AMD has openly stated...
...the Phenom II processors were designed to compete with the Core 2 Quad.

processors. This move does leave the ultra high-end to Intel, but the logical argument here is that the bulk of the market is in the mid-range.

WPRIME

The results for wPrime display the increased efficiency achieved by micro-architecture tuning. Though half a second may not seem like much for some, it's a substantial gain clock for clock versus the older design. But then, that wasn't exactly hard considering its shortcomings.

SUPER PI 8M

Super Pi not only emphasises the influence of large on-die caches on performance but also stresses the efficiency of a micro-architecture for number crunching; also proving short and powerful pipelines to be highly efficient. With these attributes in mind we see a significant gain moving from the Phenom to the Phenom II processor. Unfortunately for AMD, it also highlights the highly efficient processing power of all Core- and Nehalem-based processors. This is undeniably Intel's round.

CINEBENCH 64-BIT

Cinebench shows a direct improvement for the Deneb core over the superceded Agena core. With a 13% gain when compared clock for clock and a 31% gain between the new Phenom II X4 940 @ 3GHz (stock) and the slower and less efficient Phenom X4 9950 @ 2.6GHz (also stock). While in terms of core optimisation, the Agena core is more efficient in core management compared to Deneb with 3.85x gain versus 3.64x gain clock for clock. This is negated when you consider the fact that the Deneb core can happily function at 3.75GHz stable on air cooling compared to the Agena core which struggles to get past 3-3.2GHz. Deneb is only slightly behind Yorkfield in Cinebench but, as expected, gets served a harsh reality by the supremely designed Bloomfield processor.

CRYSIS

The increase in processor cache for the Deneb cores brings the AMD platform up to modern expectations in terms of real-world gaming performance. By analysing the gaming performance between Agena and Deneb we can see a stark increase in both the average and minimum FPS — this is what will ultimately determine the difference between playable and unplayable; max FPS is a bragging right for the most part.

Not only does the increase in cache for the Deneb core make it leap ahead of the Agena core; it brings it on par with Intel's platforms. This is evident in the GPU and CPU based benchmarks. Interestingly, we can see the difference in L2 versus L3 cache usage when we compare the Deneb, Yorkfield and Bloomfield platforms. In this comparison, the Yorkfield manages to clutch the win due to 12MB of L2 cache.

WINRAR

WinRAR is perhaps one of the most pure number-crunching benchmarks and real-world applications. Used to compress and archive files, it can demonstrate a processor's capability to manage calculation prefetching and efficient memory read and access. Not surprisingly we see a significant gain for Deneb over the Agena processor design. However, when it comes to comparing with the Intel designs, the Deneb is about 500MHz behind in terms of relative frequency necessary to make up for the efficiency difference in the designs. As for Core i7; well, it's chilling out by the pool while the others finish up.

EVEREST MEMORY BANDWIDTH

While PCMark Vantage highlighted a highly efficient and bandwidth plentiful design within the Deneb design, particularly in comparison with the Yorkfield-based Intel offerings, Everest Memory Bandwidth tests indicate another story. So what's the difference here? Simple: the Intel platforms are running dual-channel DDR3 on the Yorkfield/X48 platforms and triple-channel DDR3 on the Bloomfield/X58 platforms. As such, it's a no-brainer that these two platforms will effectively wipe the floor with the AMD processors in typical bandwidth tests. Rest assured, AMD will have Phenom II parts with DDR3 functionality later in 2009, and perhaps then we'll see the AMD and Intel once again close to one another in terms of overall memory bandwidth.

CONCLUSION

We'll try to avoid sounding like a broken record — though it can be hard at times — but the increased cache really has lead to a huge improvement in performance. This, paired with a stock frequency of 3GHz and the ability to scale substantially (in a manner we only expect to see these days from Intel processors) has ultimately led to a refreshing injection to the vein of the CPU market. This here marks a substantial step forward for AMD. It's not the blow that can dethrone Intel, but it certainly is a large cry for acknowledgement from the whole industry and rightly so.

When considering the clock for clock real-world difference and the substantial price difference, AMD is fighting a battle not seen in the market with such ferocity for some time: the battle for the average user and high value for the dollars spent on the system. For this reason the Dragon platform as a whole gets a tick in our box.

We may say that AMD is returning to its roots, and perhaps that's a good thing given the current pressure it is under from Intel. But ultimately we're just happy to see something come from AMD that suggests some sort of fight is still in this old dog.

Josh Collins

PHENOM II TEST PLATFORMS

ALL THE SPECS ON THE TEST PLATFORMS

	DENEB @ 3.0GHZ STOCK	DENEB @ 3.0GHZ TWEAKED	DENEB @ 3.75GHZ CLOCKED	AGENA @ 2.6GHZ STOCK	AGENA @ 3GHZ CLOCKED	YORKFIELD @ 3.2GHZ STOCK	YORKFIELD @ 3.6GHZ CLOCKED	YORKFIELD @ 4.0GHZ CLOCKED	BLOOMFIELD @ 3.2GHZ STOCK	BLOOMFIELD @ 3.6GHZ CLOCKED
PROCESSOR										
Model	Phenom II X4 940	Phenom II X4 940	Phenom II X4 940	Phenom X4 9950	Phenom X4 9950	Core 2 Extreme QX9650 @ QX9770	Core 2 Extreme QX9650	Core 2 Extreme QX9650	Core i7 965 Extreme Edition	Core i7 965
Core Name	Deneb	Deneb	Deneb	Agena	Agena	Yorkfield	Yorkfield	Yorkfield	Bloomfield	Bloomfield
HTT Clock Frequency (MHz)	200	250	250	200	200	-	-	-	-	-
HT Link Frequency (MHz)	1800	2250	2250	2000	2000	-	-	-	-	-
NB Freqeuncy (MHz)	1800	2250	2250	2000	2000	-	-	-	-	-
Base Clock Frequency (MHz)	-	-	-	-	-	-	-	-	133	133
Frontside Bus Frequency (MHz)	-	-	-	-	-	401	401	401	-	-
Multiplier	15	12	15	13	15	8	9	10	24	27
Uncore Clock (MHz)	-	-	-	-	-	-	-	-	3200	3200
QPI Frequency (MHz)	-	-	-	-	-	-	-	-	6400	6400
L2 Cache Capacity (KB)	512 (x4)	512 (x4)	512 (x4)	512 (x4)	512 (x4)	12288	12288	12288	256 (x4)	256 (x4)
L3 Cache Capacity (KB)	6144	6144	6144	2048	2048	-	-	-	8192	8192
Operating Frequency (GHz)	3.0	3.0	3.75	2.6	3.0	3.2	3.6	4.0	3.2	3.6
GRAPHICS CARD										
Brand	Gigabyte	Gigabyte	Gigabyte	Gigabyte	Gigabyte	Gigabyte	Gigabyte	Gigabyte	Gigabyte	Gigabyte
Base Model	HD4870	HD4870	HD4870	HD4870	HD4870	HD4870	HD4870	HD4870	HD4870	HD4870
Core Type	RV770	RV770	RV770	RV770	RV770	RV770	RV770	RV770	RV770	RV770
Core Frequency (MHz)	750	750	750	750	750	750	750	750	750	750
Memory Frequency (MHz)	900	900	900	900	900	900	900	900	900	900
Memory Type	GDDR5	GDDR5	GDDR5	GDDR5	GDDR5	GDDR5	GDDR5	GDDR5	GDDR5	GDDR5
Memory Capacity	1024MB	1024MB	1024MB	1024MB	1024MB	1024MB	1024MB	1024MB	1024MB	1024MB
MEMORY										
Brand	Corsair	Corsair	Corsair	Corsair	Corsair	Corsair	Corsair	Corsair	Corsair	Corsair
Model	Dominator CM2X1024-10000C5D	Dominator CM2X1024-10000C5D	Dominator CM2X1024-10000C5D	Dominator CM2X1024-10000C5D	Dominator CM2X1024-10000C5D	Dominator TWIN3X2048-1800C7DFIN	Dominator TWIN3X2048-1800C7DFIN	Dominator TWIN3X2048-1800C7DFIN	Dominator TR3X6G 1600C8D	Dominator TR3X6G 1600C8D
Capacity	2x1GB	2x1GB	2x1GB	2x1GB	2x1GB	2x1GB	2x1GB	2x1GB	3x2GB	3x2GB
Operating Frequency	DDR2-800	DDR2-1000	DDR2-1000	DDR2-800	DDR2-800	DDR3-1600	DDR3-1600	DDR3-1600	DDR3-1600	DDR3-1600
Operating Timings	5-5-5-18 2T	4-4-4-12 2T	4-4-4-12 2T	5-5-5-18 2T	5-5-5-18 2T	7-7-7-21 2T	7-7-7-21 2T	7-7-7-21 2T	8-8-8-24 1T	8-8-8-24 1T
Channel Configuration	Unganged	Unganged	Unganged	Unganged	Unganged	Dual	Dual	Dual	Triple	Triple
MOTHERBOARD										
Manufacturer	GIGABYTE	GIGABYTE	GIGABYTE	GIGABYTE	GIGABYTE	Foxconn	Foxconn	Foxconn	ASUS	ASUS
Model	MA790GP-DS4H	MA790GP-DS4H	MA790GP-DS4H	MA790GP-DS4H	MA790GP-DS4H	BlackOps X48	BlackOps X48	BlackOps X48	P6T Deluxe	P6T Deluxe

PHENOM II BENCHMARKS

SO, HOW DO THE BENCHMARKS MEASURE UP?

	DENEB @ 3.0GHZ STOCK	DENEB @ 3.0GHZ TWEAKED	DENEB @ 3.75GHZ CLOCKED	AGENA @ 2.6GHZ STOCK	AGENA @ 3GHZ CLOCKED	YORKFIELD @ 3.2GHZ STOCK	YORKFIELD @ 3.6GHZ CLOCKED	YORKFIELD @ 4.0GHZ CLOCKED	BLOOMFIELD @ 3.2GHZ STOCK	BLOOMFIELD @ 3.6GHZ CLOCKED
PCMark Vantage 64-bit	9805	10389	11492	9113	9616	6664	7107	7142	13926	14048
Memory	7064	7044	8269	6783	6993	5561	5699	5969	9180	9035
TV and Movies	1428	1429	1505	1424	1438	1344	1348	1377	1563	1589
Gaming	12283	13175	14293	11174	11050	7417	7704	7925	19182	21475
Music	8362	8319	9927	7595	7936	5544	5750	6225	11147	11820
Communications	8155	8508	10156	7278	8117	6502	7086	7606	10656	10581
Productivity	13804	14047	16079	12454	12744	6549	6735	7094	17832	18311
HDD	20345	20869	22135	21685	20618	23889	23990	24400	35749	24091
3DMark Vantage P Preset	9107	9125	9516	8514	9063	9570	9729	9898	10108	10207
GPU Score	8685	8742	8748	8495	8836	8746	8741	8747	8636	8638
CPU Score	10188	10509	12922	8570	9821	13338	14723	16363	20685	22427
3DMark 06 Overall Score	15163	15409	16263	12501	13952	15682	16352	16781	16569	16546
SM 2.0 Score	6002	6080	6124	4936	5507	5884	6055	6150	6106	5913
HDR/SM 3.0 Score	7199	7269	7456	5912	6444	7264	7470	7492	7426	7406
CPU Score	4155	4298	5257	3467	4061	4985	5517	6155	5939	6394
Super PI 8M	4m 50.300s	4m 37.040s	3m 49.039s	5m 45.168	5m 06.043	2m 56.202s	2m 40.042s	2m 27.607s	2m 15.159s	2m 5.970s
Cinebench 64-bit										
Single Thread	3488	3474	4347	2661	3069	3948	4445	4982	4621	5141
Multi Thread	12682	12513	15380	7809	11830	14423	15896	17527	19103	21055
multi proc speedup	3.64	3.60	3.54	2.93	3.85	3.62x	3.58x	3.52x	4.13x	4.10x
Crysis										
GPU Score Maximum	28.01	28.29	28.15	26.62	27.96	28.01	28.10	28.35	28.03	27.81
GPU Score Minimum	16.17	18.26	19.33	9.86	14.65	8.79	13.89	12.91	18.84	18.81
GPU Score Average	24.08	24.42	24.47	19.28	23.59	24.15	24.26	24.23	23.95	23.91
CPU Score Maximum	32.93	32.81	32.93	25.58	31.24	34.87	33.58	33.29	31.46	31.78
CPU Score Minimum	14.18	14.15	14.26	9.54	12.97	8.73	2.70	10.38	12.71	14.05
CPU Score Average	22.21	22.39	22.41	20.94	22.28	22.22	22.25	22.01	21.83	21.94
WinRAR (Real Word)										
Single Thread Processed (MB)	45	52	59	39	41	59	62	65	76	77
Single Thread Average (KB/s)	737	859	974	635	666	981	1025	1069	1259	1283
Multi Thread Processed (MB)	114	130	143	93	102	120	124	128	214	233
Multi Thread Average (KB/s)	1936	2152	2324	1601	1699	2006	2063	2248	3592	4115
Everest Memory Bandwidth										
Read (MB/s)	6973	8743	8685	7008	7070	9968	10166	10391	17642	17283
Write (MB/s)	6115	7556	7583	5045	5146	8533	8556	8527	14000	14197
Copy (MB/s)	6070	7305	11451	8273	8292	9240	9453	9517	20037	20706
Latency (ns)	63.2	50.1	48.4	62.0	61.2	57.7	56.4	55.9	31.4	31.4

Great-looking prints and easy to use, but missing some features for the price.

7/10

Epson Stylus Photo TX800FW

A good MFD with some unique features.

Epson
www.epson.com.au
$399

Good user interface; good photo printing. ✔

No computer faxing; duplexer is optional. ✖

SPECIAL FEATURES
Claria six-colour ink system
Prints directly onto discs
Standalone printing functionality

A particularly stylish inkjet all-in-one, the Epson Stylus Photo TX800FW has clean lines and a high-gloss black finish that will complement many consumer devices. It measures 47 x 39 x 20cm, which is a little large to place on a typical desk with a PC.

It can be used with a single computer via the USB 2.0 port, or shared across a network using the built-in 10/100 Ethernet and Wi-Fi (802.11b/g) interfaces. A Bluetooth dongle is an optional extra, as is the duplex unit.

While the physical setup was par for the course, the Windows software installation was more problematic. Following the setup instructions concerning the firewall didn't work, so we had to isolate the LAN and disable the security software in order to install the software. Installation on Mac OS X was more straightforward.

The software bundle comprises printer and scanner drivers, EasyPrint, ICC profiles, AABBYY FineReader Sprint Plus, Print CD, Easy Photo Print and some platform-specific utilities.

The nominal print speed is 40ppm for colour text in draft mode, which doesn't tell you much about real-world use. Our business document test returned a click-to-drop time of 40 seconds for the first A4 colour page, with the second emerging after another 8 seconds.

We expected better quality text from a $400 MFD. The graphic elements were appropriately bright and smooth, and we noticed no banding or other irregularities.

The TX800FW uses Epson's Claria six-colour ink system, which combined with Epson Premium Glossy paper gave the results we've come to expect: an even, high-gloss finish with no bronzing, good skin tones and vivid colours. Printing a 15 x 10cm photo took a respectable one minute 31 seconds. Like many higher-end inkjets, the TX800FW can print directly onto CDs and DVDs. Standalone printing is supported for memory cards and for PictBridge cameras or USB storage devices.

Unusual options include the ability to print ruled or graph paper, or writing paper with a coloured background using a photo from a memory card as the image. It's also possible to back up images from a memory card to a USB storage device.

The TX800FW gave very good results in our A4 colour-copying test. The only noticeable issue was that our test image would have looked better with a little more magenta on the page.

It's supposed to be possible to initiate scanning from the TX800FW's control panel to create an image file, a PDF or an email attachment, but we were unable to get this to work. Scanning from the EPSON Scan application or TWAIN-compliant applications gave very pleasing results though.

On the fax side, the TX800FW is a standalone device, with no provision for sending or receiving from a computer.

All told, the TX800FW looks good, is easy to use and produces good photos, but for almost $400 we expect duplex printing as standard and we'd be happy to swap the novelty features for computer-based fax capability.

Stephen Withers

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CORPSOFT .COM.AU

7/10

AVerTV Hybrid Volar HX

This card does everything you could want.

Avermedia
www.avermedia.com
$115

✔ Fits inside ExpressCard slot; analogue and digital tuner.

✖ Picture-in-picture limited; software awkward with slow EPG.

SPECIAL FEATURES
- HD digital & analogue tuner
- 'High gain' notebook antenna
- AVerTV PRV application

The AVerTV Hybrid Volar HX is a small lightweight HD USB tuner card with just about everything you could want. The card has an HD digital tuner and analogue tuner as well as FM radio. It is compatible with XP and Vista MCE using BCA drivers and includes a useable software bundle.

The front of the card has the USB socket with full sized socket for the antenna on the back, so you don't need to mess with adaptor leads. On the side is a breakout connector for analogue audio, composite video and S-Video. This allows you to use the device to convert analogue video (from VHS or camcorders) to digital.

Inside the box is a remote, a 'high gain' notebook antenna and a bonus AVermedia armband. The remote is a little small and limited to only providing basic controls (channel, volume, power and input source) rather than giving full control over recording and MCE. The 'high gain' antenna, whilst cute, appears to be high gain in name only, as it failed to bring in any channels in our inner-city office.

The supplied AVerTV PVR application is easy enough to use, although we found the interface somewhat clumsy compared to other PVR applications. AVerTV provides all the typical PVR functionality you would expect, including the ability to compress recordings in real time to medium resolution (320 x 200) MPEG-4 for viewing on iPods and compatible media players.

Being only a single tuner device, picture-in-picture is limited to watching multiple channels from the same broadcaster, whilst channel preview surfs through the channels displaying a thumbnail of each. We found the EPG to be a little sluggish, with you needing to select each channel in turn to retrieve the full EPG. Unfortunately IceTV is not supported, so you are stuck with using the broadcasters' guides.

It's a reasonably priced card that does the job well — just don't get excited over the accessories.

David Neiger

8/10

Dvico TViX-PVR 3330

At last, an easy-to-use PVR.

Dvico
www.dvico.com
$529

✔ Easy to use; supports most audio and video codecs; HD tuner.

✖ No HDD; no Wi-Fi connectivity; no support for SMB shares.

SPECIAL FEATURES
- LED front display
- Two USB slots for ext. devices
- Optional hard drive

The Dvico TViX R-3330 PVR may sound geeky and, to be honest, is not the most attractive piece of electronics we have seen, but it works surprisingly well as a standalone PVR or as a hub of a connected entertainment network.

Although the unit is sold as being portable, this is probably in comparison to a typical PVR rather than an absolute statement. It is heavy and looks like a brick, with an LED front display and blue backlit circular controls. The back of the unit has almost all of the connectors you would want except for multi-channel analogue audio. Unlike most PVRs, there are two USB slots for adding external HDDs, thumb drives or USB card readers. The R-3330 does not ship with a hard drive, although most resellers will install one for you at additional cost.

Installing the unit is surprisingly easy. Simply plug in a television antenna and video connection cables and turn it on. The quick setup prompts you to select a menu language and then displays an easy-to-navigate screen to allow you to access stored video content, music, photos (JPEG only) or watch HD TV. When you select HD TV for the first time, the unit automatically conducts a scan and within a few minutes finds all available digital channels in your area.

All the features you would want are there, including the ability to play most video formats (with the exception of H.264, MKV, WMV and Blu-ray codecs). Scheduled recording is easy enough to do using either the FTA EPG, direct or one touch time record. If you connect the unit up to your network you can also FTP recordings to and from the hard disk.

Our only criticisms are that it does not include Wi-Fi support nor support for SMB (Windows shares). Other than that, it's a great PVR.

David Neiger

Thecus N4100PRO

7/10

Altech
www.thecus.com
$799

Easy setup; lots of data sharing options. ✔

Too noisy for a desktop. ✖

The Thecus N4100PRO is a storage appliance firmly pitched at the small or home business owner. With its quiet (although not silent), operation it should be close enough to access but not in your workspace. There's room for four disks that can be set up in a variety of RAID configurations, Gigabit LAN and three USB ports for connecting hard disks or printer sharing.

Installing drives is straightforward. You just flip a lever on the disk caddies and attach the drive with the supplied screws. The caddies slide into it easily and there's no wriggling or force needed. There are plenty of options with support for JBOD and RAID 0, 1, 5, 6 and 10. If you choose RAID 5 or 6 you can specify which disk in the array is to be designated as the spare in case of failure. Disks can be hot-swapped.

The array we created (RAID 5 using four 1TB disks) was easily seen on our LAN by both Windows and Mac systems. Performance-wise the N4100PRO didn't disappoint. We copied a 350MB video file to the array from our Windows system onto a mapped share and it was across in just a few seconds.

To top things off, the N4100PRO has a RS232 port, so it can be connected to and operate with a UPS, and there are power management settings that will power the N4100PRO on and off at specific times. Used in a small office, you can schedule the device to turn off outside of work hours and turn on when the workday starts.

There's plenty to like about the Thecus N4100PRO. It's easy to set up, it offers plenty of flexibility and performs well.

Anthony Caruana

Thecus M3800 Stream Box

7/10

Altech
www.altech.com.au
$990

Easy to use; download manager. ✔

Playback doesn't support resume. ✖

The Thecus M3800 Stream Box protects and serves your media with a minimum of fuss. Most of the Stream Box's specifications read like many other SOHO NAS units. Three disks, RAID 5 capability, file serving, FTP, iTunes and all the expected functions and features. However, where it varies is that it comes with direct video output for your TV. The idea is that it not only stores your media but is the playback device.

Connectivity to your TV can be via component, composite and HDMI at up to full 1080p depending on your chosen interface. Setup was straightforward. Once the Stream Box was connected to our LAN via its Gigabit interface we used the accompanying CD to sort out the basic settings and configured things through a browser.

We tried out ripped DVDs with no conversion: content was playable directly from the vob files in the Video TS folder. While playing back a movie, we copied more video files to the device and didn't notice any dropped frames or interruption to playback. We played back DivX, Xvid and MPEG files.

One annoying thing we found was that if we paused a movie and went back to the menu the movie started from the beginning again and we had to fast-forward to where we'd left off.

As well as being able to drag and drop your own media to the Stream Box, the software comes with its own download manager, with support for HTTP, FTP and BitTorrent downloading.

Although it's more suited to the technically-minded user, its ability to act as a storage and playback device makes it worth considering for any home media setup.

Anthony Caruana

ASUS
No.1 in Quality and Services
- The Wall Street Journal Asia
TOP CHOICE
FOR GAMERS
Republic of Gamers
ASUS Gaming Series
WWW.GAMEDUDE.COM.AU
GameDude Computers 3353 Pacific Hwy Springwood, 4127 QLD | Phone: (07) 3387 1500

At 60in, 50kg and twelve grand, the Kuro is a handful (but it's worth it).

8/10

Pioneer Kuro PDP-LX609A

Simply stunning: just make sure you've got the room.

Pioneer
www.pioneer.com.au
$12,499

✔ Stunning HD picture; few jaggies; good speakers.

✖ Better black performance elsewhere.

SPECIAL FEATURES
- 60in Full HD display
- Picture modes
- Advanced settings
- Built-in EPG
- USB & DNLA

APC MAGAZINE HIGHLY RECOMMENDED

We were seriously looking forward to Pioneer's latest plasma turning up, not least because it was the 60in model (a 50in version also exists). But we were quickly given a stark reminder about the practicalities of such immense screens. At 50kg it was too heavy for our TV stand and, with two 18W speakers to bolt onto each side, we couldn't open one of the doors to our living room anymore. Also note that the anti-fall safety procedures should be heeded: this is a very-real, potential fly swat for pesky humans.

The glossy black plastic bezel and stand look good and it scanned and stored all analogue (optional) and digital channels when we turned it on. The remote isn't the most intuitive or quickest we've used but it's responsive enough and onscreen menus are simple to understand.

Picture mode has several presets including Standard, Performance, Game, Sport and Movie. Those who like to fiddle can use advanced menus to change things like gamma settings and tune each preset separately.

To test its best video output we used a top-end Sony Blu-ray player and a top-quality, Pure AV HDMI cable. We were mightily impressed. There was practically no judder in slow and fast panning shots. The detail, crispness and clarity of the picture, running in native 24fps 1080p/24 was brilliant. Jaggies were near invisible and contrast was excellent. It also sailed through our HQV benchmarks, doing particularly well at masking jaggies and de-interlacing.

Screens this large are naturally unforgiving with low-res and poor-quality sources and our budget DVD player looked poor over HDMI. However, when it's at its best we were impressed at the upscaling and lack of jaggies: though they're not completely absent. However, we've seen blacker letterbox bars from Sony and Samsung LCDs. But colours were vibrant and flesh tones natural. HDTV looked good with minimal jaggies and judder and the same could be said for SD TV.

All in all we were very pleased with every aspect of the display we saw. The speakers are punchy and get very loud, though very-big rooms may still want to add a subwoofer.

Most of the standard inputs are included, although there is no DisplayPort. Optical S/PDIF is present, although you'll have trouble reaching everything once it's installed.

The built-in EPG is one of the best we've seen. Other features include a light sensor, USB port for media playback and DLNA-compatible media server, so you can play footage from your PC.

Ultimately, there's very little to complain about. If you can afford it, fit it in your house and back it up with decent Blu-ray player, it's fantastic.

Nick Ross

9/10 Kaspersky IS 2009

Speed of scans proves the winner.

Kaspersky
www.kaspersky.com.au
$82.50 (1 year subscription)

Blindingly fast scan speeds. ✔

Overly long installation process. ✖

SPECIAL FEATURES
Speedy subsequent scans
Improved interface
Content filtering
IM protection
Identity theft protection

I've always had a fraught relationship with security software. I look for antivirus and antispyware programs that don't slow my PC to a crawl by hogging resources and don't hound me with unnecessary warning messages. In short, I don't want to constantly engage with them.

The problem with most consumer security software is that it's constantly trying to remind you that it's protecting you and that everything you do with your PC is a potential security threat. While some users might appreciate that security blanket feeling, I find it annoying and time-wasting.

My own approach to PC security is simple: I like to minimise resource-hogging real-time protection and then schedule a big scan each day to check that everything is OK. The problem with most suites is that the scans can take forever. To get McAfee to do a full scan of two nearly full 250GB hard disks on my home PC is an overnight job. Norton takes less, but still forever as far as I'm concerned.

Once I updated to a one-terabyte disk, I dreaded doing a full scan. This is where Kaspersky Internet Security 2009 was the revelation. When you first install it, Kaspersky does an initial antivirus and antispyware scan that's not much faster than those of the competition. But in subsequent scans it doesn't scan files that haven't changed. As a result, the scans become blindingly fast. I can now scan my system in a couple of minutes instead of hours. The scan is set to manual by default, but you can schedule it to turn on at particular intervals.

KIS's integrated approach to security gives you a lot of control over your defences.

So, it's possible to scan my system quickly and fully every day, which also ensures that any new virus-definition updates downloaded that day are immediately used to vet all my content. Normally if the file containing a new virus listed in a virus definitions update is not executed, it won't be picked up by real-time scanning; it will just sit unobserved until the next scan. A daily scan, on the other hand, will flush it out.

Another useful feature of Kaspersky Internet Security is that if you interrupt a scan, you don't have to start again. It will resume it where it left off. So, what about the rest of the Kaspersky Internet Security 2009 suite?

Like its competitors, Kaspersky covers all the basics, including anti-malware, system and application protection, online security and content filtering (for email and web), IM protection, a two-way firewall, and identity theft protection. The UI is greatly improved compared to the previous version.

In summary, Kaspersky takes a bit of time to install (requires a few reboots) and then hounds you for a while with dialog boxes that let you tell it whether various applications should be trusted or not, but eventually it disappears, making a lot of the decisions itself. That's how it should be.

One thing I would like security suites to get right is the constant warnings that you are not fully protected if you disable one of their features. You may choose not to have anti-spam enabled because you don't actually use your Outlook email client, for instance. Kaspersky and every other security suite will downgrade the protection status from green or fully protected and keep warning you that your computer is a risk, when it's not.

Tony Sarno

APC MAGAZINE
apc
EDITOR'S CHOICE
Built with genuine Windows Vista® Home Premium
FREE WINDOWS INSTALLATION!
XGAMER
Windows Vista
Home Premium
Microsoft
Buy any Microsoft Windows Vista or XP with any XGamer system and we will install it for FREE!
WWW.GAMEDUDE.COM.AU
PH: 3387 1500 - ADDRESS: 3353 PACIFIC HWY, SPRINGWOOD, QLD, 4127

BEST CHOICE NETBOOKS

From humble beginnings with the Eee PC, netbooks have gone from strength to strength. APC looks at the choices available for the mobile geek.

It seems every notebook maker has stepped up to the crease to have a hit at the newest product category around. Netbooks comfortably fill the niche of truly portable computing, where mobiles are just too small and notebooks too big. Usually coming in around the 1kg mark, they are low powered and small, with most models using a 7-9in screen. Many models follow a similar formula, with Intel's Atom low power processors and solid state drives to cut down on moving parts and battery consumption. Battery life is the real decider on these systems. After all, a netbook with no power is just an expensive paperweight. Don't expect rip-roaring performance; there's usually just enough grunt to tap out some documents, surf the web on the go or play a non-HD video clip on the bus on the way home.

UNDER REVIEW

Acer Aspire One

Eee PC S101

Inspiron Mini 9

Inspiron Mini 12

Fujitsu M1010

HP Mini 1000

Lenovo IdeaPad

MSI Wind U100

MSI Wind U120H

Toshiba NB100

What do I look for?

In a good netbook. . .

Even though you have to make sacrifices with netbooks, there's still some things you should always look out for. Keep the following factors in mind when you're weighing up between models...

OS

This is one of the times when you really can have a choice. Some netbooks can ship with Linux (usually based on Ubuntu) installed.

CONNECTIVITY

As a portable system, you're often reliant on Wi-Fi networks or mobile broadband to get online. Choose a model with the access you need.

DISK

Hard disk capacity will be limited. Solid state drives offer longer battery life but much lower capacities.

BATTERY

A netbook (or notebook) with no juice is useless. Try and choose a model with a 6-cell or greater battery capacity and enquire about pricing on an extra/spare.

SCREEN

The screens in netbooks tend to be of lower quality than notebooks to maintain low price points. Be sure you can live with what you buy.

KEYBOARD

Before you buy, have a tap away at the keyboard in store. Smaller key sizes, funny layouts and limited space may surprise you.

Acer Aspire One

Good looks come complete with creature comforts.

The base spec of the One hasn't changed, it's still got the 1.6GHz Intel Atom processor, 8.9in screen and 85 per cent size keyboard, but it's now available in a more mainstream package. Windows XP Home makes it better-suited for everyday users, and a healthy 120GB hard drive provides just enough room to make it a viable option as a full-time computer. Looks-wise, Acer has done a great job at making it feel like a quality notebook. The beauty of the Aspire One is that it doesn't sacrifice too many creature comforts to arrive at its tiny size. The 8.9in display is small, but it's got a comfortable 1,024 x 600-pixel resolution. The keyboard is only 85 per cent the size of a full one, but you can rest your fingers on each key and use it for touch-typing. All of the standard ports are present, namely three USB 2.0 ports, VGA, Ethernet, headphone and mic jacks, and a five-in-one memory card reader. It also throws in a dedicated SD/SDHC card reader for adding more storage. Performance from the 1.6GHz Intel Atom processor and 1GB of RAM is generally responsive. You can upgrade the Aspire One's RAM to 2GB to boost performance further. We also noticed a persistent low-pitched buzzing sound while using the Aspire One that's just loud enough to be annoying. Viewing angles on the screen are extremely limited, but tilted at a 135-degree angle, colours are bright and well-saturated. The speakers are surprisingly loud for such a small machine, and it played an XviD copy of *Heroes* with no dropped frames or audio sync issues. We tested the Aspire One with the optional 6-cell battery. With the screen set to 40 per cent brightness and all power-saving features off, it ran for 5 hours and 6 minutes with Wi-Fi on. Couple that with the 3-cell battery, which runs for 2.5 hours, and you've easily got all-day battery life.

Acer
@ www.acer.com.au

✔ Design; hard drive; keyboard.
✖ Fiddly mouse; no Bluetooth; hard to upgrade RAM.

ASUS Eee PC S101

Both sexy and smart, this is the Tina Fey of netbooks. . .

Packed into the S101's metallic mocha chassis is the same tech checklist as pretty much every other system in our roundup, but style set it apart (as did the premium price tag); the brushed metal wrist rest and trackpad, elegantly tapered lines, trim 1.8cm waistline and fashionista finish ensure the S101's status as king of the catwalk. But the S101 is not without meatier merits. A matte coating on the sharp 10.2in screen keeps the netbook useable in a much wider range of ambient lighting conditions than the glossy panel of most other netbooks. The bundled high-capacity 4900mAh Lithium Polymer battery stretched to 3.5 hours under maximum load, so we'd expect the S101 to be approaching the five hour mark long after its three-cell competitors have turned up their toes. Equally impressive is that the Xpress Path utility for accelerated Windows XP startup and shutdown times. We clocked the S101 at 20 seconds startup and 10 seconds shutdown — a huge margin over the respective 40 seconds and 34 seconds of the Dell Inspiron Mini 9. Additional tweak-friendly utilities can boost performance or extend battery life outside the normal range. Internal storage is limited to 16GB solid state drive in the Windows XP model (32GB for Linux), although ASUS trumpets 62GB of 'hybrid storage' — a figure obtained by adding the 16GB SSD, the bundled 16GB SDHC card and the 30GB of free online Eee Storage hosted by ASUS. The responsive keyboard is almost full size and boasts a short and well-defined travel, although the actual strike area on the keys themselves is a little small. And the decision to chop the right Shift key in half and wedge it to the right of the Up Arrow will likely be a major source of frustration.

ASUSTeK Computer
@ www.asus.com.au

✔ Chic design; XP acceleration; silent; battery life.
✖ Premium price; limited to 16GB solid state drive.

Inspiron Mini 9

The specs are tight and the price is right, but not the keyboard. . .

The Inspiron Mini 9 was Dell's debutante netbook offering, followed by the Mini 10 and the Mini 12. As such, the Mini 9 represented some fresh thinking that still sets it apart from the pack in ways good and bad. That list starts with the 16GB solid state drive which helps keep the Mini 9 small, light (1kg) and blessedly silent. Partnered to a novel 4-cell battery instead of the standard 3-cell slab of most other netbooks, the Mini 9 trots along for 2.5 hours under maximum drain so you should expect to gain an extra hour in real-world mixed usage. All the same, don't expect the Mini 9 to blitz the performance stakes or stay ice-cool on your lap, as it gets toasty warm. Another win, at least for the screwdriver set, is the ease of upgrading the Mini 9 to 2GB of RAM (which is as much as the Atom platform's chipset supports). Offsetting those traits and the overall delightfulness of this Liliputian laptop is the keyboard. While the action itself is crisp and well-defined, Dell made some compromises in shrinking the keyboard to Mini 9 size. Some keys such as right Shift are too narrow, while others have their position changed entirely. The oft-used comma lives down near the space bar rather than to the right of Enter and the strip of dedicated Function keys are missing entirely, having been remapped as Fn+ modifiers along the middle row. The screen is par for the course but nothing to email home about. The sizeable trackpad feels good, but while the buttons are almost silent they felt quite loose. The rest of the recipe is par for the netbook course: Atom N270, 1GB of RAM, three USB ports, memory card slot, Ethernet, Bluetooth and 802.11b/g wireless. The Mini 9 can also be ordered with an inbuilt 3G HSDPA modem, but this model is exclusive to Vodafone on a 24 month contract of $60 per month for 5GB.

Dell
www.dell.com.au

✔ Compact; silent; decent battery life; 2GB upgrade.
✖ Awkward keyboard; optional 3G limited to Vodafone.

Inspiron Mini 12

Just because a netbook is as big as a notebook, don't expect one.

The 12in screen officially makes the Dell Inspiron Mini 12 the world's biggest netbook, but weighing in at 1.24kg you have to wonder if this isn't the closest thing yet to a $1,000 MacBook Air. The narrow leading edge 12 is squeaky clean, without a switch or indicator light in sight. Nor are there any buttons or bright lights on the top deck, apart from the power switch. On the left side lurk two USB ports, VGA out, the DC power socket and a vertical security lock slot. And on the right, we spy the 10/100 Ethernet jack, a third USB port, mic and speaker sockets and the SD/MS memory card slot. Unlike many netbooks, the Inspiron Mini 12 has near full-size keys and also a complete set of function keys (all the way to F12!) on the top row. It is fitted with a hard disk drive of 60GB or 80GB (Aussies get the 80GB version), and the screen clocks up to 1,280 x 800. There are two mini-card slots tucked under its belly: the first is for a Broadcom 11g Wi-Fi card, with the second sporting a 3G HSDPA wireless broadband modem in selected markets. Dell tells us that 3G will be available on both the Mini 12 and Mini 9 in early 2009. Like most netbook manufacturers, Dell reached straight for Intel's Atom processor, but chose processors from the Z-series 'Silverthorne' family (specifically, the Z520 and Z530). Parked next to the Z-series CPUs is Intel's low-power Poulsbo chipset which has a significant drawback: it supports a maximum 1GB of RAM. As a result, while the Inspiron Mini 12 packs 1GB of memory out of the box, that's as far as you can take things. We're not convinced that shoehorning Vista into a netbook is the path to true wisdom, but if the Inspiron Mini 12 has a single Achilles Heel, it's likely to be battery life. It ships with a three-cell 24W battery, and in our tests the Mini 12 managed only 2.5 hours.

Dell
www.dell.com.au

✔ Form factor of a notebook; price of a netbook.
✖ 1GB memory limit; Vista; battery life.

Fujitsu M1010

Yet another netbook. Will it offer anything new?

Like the vast majority of netbooks, the Fujitsu M1010 is powered by Intel's Atom architecture — a 1.6GHz N270 Atom CPU and Intel 945 GSE/ICH7 chipsets. It has 1GB of DDR2 RAM, a Toshiba 60GB 4,200rpm 1.8in HDD and an 8.9in LCD screen running at 1,024 x 600. It's certainly a compact little critter, being noticeably narrower than other models like the Acer Aspire One and weighing in at around 1kg. The smaller chassis comes at a price — the keyboard is cramped and it's easy to mistype. The trackpad is quite nice, with big, usable left- and right-click buttons. All aspects of communication are taken care of — 10/100 LAN, 802.11b/g WLAN and Bluetooth. The embedded webcam is 1.3 megapixels, which is better than some units, and there's also a 34mm ExpressCard slot if you want to add 3.5G mobile networking. For external connectivity, there's the standard VGA-out port, two USB 2.0 ports and a multi-format card reader. General performance was good, with the system running on Windows XP Home Edition. The desktop was responsive and there was no noticeable lag or hard drive thrashing. Given the small screen resolution we couldn't complete a basic PCMark05 system test, but the unit was able to get through hard drive, memory and CPU tests without any dramas. Battery life wasn't bad: the unit ships with a 4-cell Li-Ion battery. Our stress test drained it in three hours, but that would improve with more aggressive power-saving features enabled. The overall design isn't anything special. There are no sleek lines or even any of that netbook "coolness" which so many units have. We really are spoiled for choice when it comes to netbooks, and as a result it's very hard to get excited about the M1010 as it just doesn't offer anything that hasn't been done before.

Fujitsu	✔ Solid performance; 1.3-megapixel webcam.
www.fujitsu.com.au	✖ Average battery; very small keyboard; clunky styling.

HP Mini 1000

HP's second-gen netbook makes a stab at the mainstream market.

The Mini 1000 largely sticks to the now-established netbook recipe. That means an Atom 1.6GHz N270 processor, 1GB of RAM and Windows XP Home Edition. The 1.8in hard disk spins at a slower 4,200rpm, although we doubt the difference would be noticeable in normal day-to-day use. What you will notice is the meagre 80GB capacity of that drive. One place where the Mini 1000 takes the lead is its design. Its standout trait has to be its keyboard. Sized to 92% of a regular keyboard, it's almost identical to that of the 2133 Mini-Note. The primary keys are large and square, presenting an ample-sized strike area for your fingers, while the surface of the keys is slightly concave. The screen is incredibly bright, thanks to the use of LED backlighting enhanced by a pane of high-gloss glass which extends to the edges of the lid. The compact form of the Mini 1000 necessitates a few compromises on the selection of ports. There are only two USB ports, a memory card slot for SD and Memory Stick wafers, along with an insert that conceals the bay for HP's Mini Mobile Drive system. Its other proprietary element is an unusual connector which substitutes for the standard VGA port. Battery life is roughly equivalent to what we've come to expect from most three-cell 10.2in netbooks. Playing back a handful of downloaded videos with screen brightness set to 66%, volume at maximum and connected to a Wi-Fi network saw the Mini 1000 trot along for two hours 15 minutes. The Mini 1000 has plenty to offer the average PC buyer, and we've no doubt HP will move plenty — even with the eyebrow-raising $899 price tag. But more tech-savvy shoppers will be waiting for that sticker to be slashed by at least $150 before the Mini 1000 can really stand its ground against some of the better-spec'd competitors.

HP	✔ Keyboard; overall design; build; bright LED screen.
www.hp.com.au	✖ Hard drive; two USB ports; VGA out cable.

Lenovo IdeaPad S10

A 10in netbook that almost hits the sweet spot.

At first glance it was almost toy-like, although the squared-off slabette slowly grew on us. That's more than we could say for the 'white chocolate' colour scheme, which is destined to be one of those like-or-loathe traits. While the 2.3cm waistline and 1.2kg weight put it on the heftier side, this is hard to avoid in a 10in model, and it's still thinner and lighter than ASUS's Eee PC 1000H. The keyboard was a bit of a letdown. Maybe we'd been expecting too much, given that Lenovo's ThinkPads are largely considered to be the yardstick of excellence for notebook keyboards. The keys are a little on the soft and unresponsive side and felt a little too tightly packed. Lenovo's netbook recipe is par for the course: Intel's 1.6GHz Atom 270 processor, 1GB of RAM and a 160GB hard drive. Happily, there are a few features setting the S10 apart from the pack.

An ExpressCard/34 slot allows users to quickly slide in a 3G HSDPA modem card, although this slot appears at the expense of a third USB port. Like its full-featured IdeaPad siblings, the S10 comes with a system backup and recovery package called OneKey Recovery 6.0. This is a highly stripped-down version of CyberLink's PowerRecover software. As a result, the 160GB 2.5 inch hard drive has only 104GB available to the user, allowing for XP's footprint. The D drive is roped off at 30GB and contains all of the S10's drivers plus the OneKey backup folder. A panel on the netbook's underside provides easy access to the hard drive and RAM bay, should you wish to bump up either. Due to tech issues we were unable to assess two issues on which the S10 has been hammered overseas: a too-short battery life (estimates are 2.5 hours) and excessive underside heat.

Lenovo
www.lenovo.com.au
✔ Easy to upgrade; backup software.
✖ Colour scheme; keyboard; heat.

MSI Wind U100

It's almost the perfect laptop — just don't put it on your lap.

There are plenty of reasons the Wind U100 remains one of the most popular and highly regarded netbooks on the market. In true Taiwanese form, MSI has thrown just about everything into this nondescript whitebook while setting the price well below what you'd expect to pay for the big brands. And even that RRP is subject to aggressive discounting by MSI's manifold dealers, so the $749 sticker is slashed to around $600. Try to get any other netbook with a 10.2 inch screen, let alone a 120GB 5,400rpm hard drive and 802.11n wireless for so little. That the U100 has also been embraced by propeller heads means there's a solid online community sharing tips, tricks and performance-enhancing BIOS tweaks. Want to upgrade the standard 2.5in drive to something with higher capacity? How about nuking XP for any flavour of Linux or even OS X to turn the U100 into a fully-working hackintosh, complete with downloadable artwork to rebrand it as a MacBook Nano? That's how flexible the U100 is. The keyboard is not the best in its class (that honour belongs to the HP Mini 1000) but it's far from the worst — it feels a little soft and plastic but it's up to the job. The six-cell 5,200mAh battery delivers a runtime just shy of four hours under maximum load, so you could trot beyond five hours before topping up the tank. And while it doesn't have the streamlined fit of a three-cell module, there are benefits to having a little extra battery booty. The U100 ends up raised slightly from the desk, which has the happy side effect of enhancing typing comfort and improving airflow under the chassis. The biggest flaw is the that the weight distribution favours the screen rather than the main chassis, meaning it can't easily be used on your lap.

MSI
www.msicomputer.com.au
✔ Value; screen; hard drive; 802.11n; battery.
✖ Can't be used on your lap due to weighting.

MSI Wind U120H

Just like the Wind U100, but with added 3G goodness.

This update of the Wind U100 has the same basic specs and strengths as that popular model but adds an inbuilt 3G HSDPA modem and face recognition software. Both of these traits are aimed more at the business and mobile pro audience. The facial recognition is mainly of novelty value; we suspect most business users would rather trust a decent password any day. Far more useful is the integrated 3G modem, which gets you online without stealing one of the netbook's USB ports. The modem supports 7.2Mbit/s HSDPA on the 2,100MHz and 850MHz bands, which makes it good for the standard 3G networks of Optus, Three and Vodafone as well as Telstra's Next G network. However, MSI advised the modem doesn't work on the 900MHz HSDPA extensions of the Optus and Vodafone networks. While the 3G version of Dell's Inspiron Mini 9 locks you into Vodafone, the Wind U120H is carrier-agnostic: you can buy the netbook from any MSI dealer and drop any SIM card into the slot. This makes the U120H a far more flexible proposition, especially if you need the greater coverage of Next G or want to avoid the contract lock-in which usually comes with buying a 3G USB modem as part of your telco's mobile broadband bundle. That aside, the U120H is almost no different to the U100. The trackpad has two buttons compared to the single long strip of U100, but these make an annoyingly sharp metallic noise when pressed. There's a minor styling revamp for the side panels, while the display bezel and hinge assembly are now finished in a high-gloss black in an attempt to give the U120H a more professional look. Unfortunately, MSI didn't rethink the weight distribution, so the U120 still tips head-over-arse when it's sitting on your lap.

MSI
@ www.msicomputer.com.au
✔ Great specs; four-hour battery life; 3G modem.
✖ Can't be used on your lap due to weighting.

Toshiba NB100

It may look the part, but we advise you say no to this netbook.

Given Toshiba's mobile computing heritage and expertise, we expected a lot more from its debut netbook. The blueprint is bog standard 'netbook 101': an Atom N270 processor, 1GB of RAM, a 120GB hard drive loaded with Windows XP Home. Three USB ports, 802.11g Wi-Fi, Bluetooth, webcam, memory card reader, yadda yadda yadda. The design is worse than just starkly utilitarian: it's old fashioned, with its chunky chassis, black plastic panelling and silver plastic trim. The keyboard is the worst of any netbook in the 8.9in form factor, mainly because the keys themselves are so small that you'd swear they belong to a 7in netbook. The 1,024 x 600 screen uses one of Toshiba's 'TruBrite' panels with a glossy high-contrast finish: crisp and vibrant but prone to excessive glare. Battery life is sub-par. With 802.11g Wi-Fi running, the screen brightness at 66% and the volume wound all the way up the NB100 managed only 148 minutes. Toshiba deserves a tip of the hat for sensibly locating some ports on the rear of the NB100 rather than the sides. The VGA port sits at the far right, to one side of the extended battery booty, allowing plenty of room for the VGA connector and shroud. Ethernet and AC sockets are grouped together on the left. It's also nice to see an easy access panel for those who want to upgrade the NB100's factory-fitted 1GB of RAM to the maximum 2GB which the Atom chipset can support. We were mystifed by the selection of third-party software. Why does a netbook without an optical drive come with Toshiba's DVD player software or its assortments of CD and DVD authoring software? We can't escape the feeling that Toshiba simply took its standard Windows XP image for consumer notebooks and chucked in the NB100's hardware drivers in a rush to get a netbook onto the market.

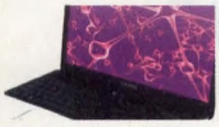
Toshiba
@ www.toshiba.com.au
✔ Charge-and-go USB ports; easy to upgrade RAM.
✖ Battery; bloatware; design; small keyboard/trackpad.

THE BEST STUDY TECH

The kids are back in class — so we've chosen the best gear for students so you can keep them ahead of the technology curve.

With school settling in for another year, it's time to take stock on just how the kids are prepared for learning. Gone are the days when a pencil case and a few sharpened HB's were enough to get you through. Classrooms these days are connected, utilising or pioneering technologies to help children learn faster and smarter. Today's student needs the right tools to enable their learning, which means a notebook PC. We looked at notebooks' performance and connectivity options, as well as their survivability. After outfitting with a suitable PC there's also a need these days to stay in touch, so we've rounded up some value-added phones too. Of course, nothing precludes people of all ages using these devices. The value and usability these devices offer are tantalising to even the biggest kids.

UNDER REVIEW


Compaq Presario CQ60

Pioneer DreamBook Lite

Toshiba L300 Satellite

BlackBerry Pearl Flip 8220

Palm Centro

Palm Treo 500v

Compaq Presario CQ60

Rugged and powerful (provided your child can lift it).

At twice the DreamBook's price, we expected big things out of the Compaq Presario. And we weren't disappointed. OK, so maybe a couple of minor niggles stop it from getting dux of the class, but overall this is a very solid notebook. At its heart lies a Core 2 Duo purring by at 2GHz, giving the kids more than enough grunt to hack through the encryption protecting the school's test result database. A healthy 2GB of memory gives the CPU plenty to play with, while the integrated Intel 4500MHD gets the job done in a stable if unspectacular fashion. There's plenty of power for all of the apps a school kid is going to throw at this notebook, but they'll be sorely disappointed if they try to game on it. But that's why the Wii exists. Vista Basic runs well regardless of the budget-level specs. It might not have the biggest monitor in the roundup, but the image quality was hard to fault. The keyboard is full sized, including a numpad, and the DVD-RW drive will come in mighty handy. What could be the deciding factor for nervous parents though is the build quality. We're pleased to report that this Compaq has been built well, feeling stronger and stiffer than any of the competition. A side-effect of this is a relatively heavy weight of 2.75kg. We'd rather our kids sweat it out a little more anyway, what with obesity becoming such a problem in Aussie schools. Battery life was solid, at two hours twenty-one minutes, as was the 140GB hard drive. If there is an issue, it's one of price. With the Toshiba offering a very similar user experience, but at only $850, we're struggling to see what you get for an extra $350. Perhaps Compaq will drop the price in the near future, in which case we'd be hard pressed to pick a winner between the two, but until then the Toshiba is friendlier on the wallet, and thus gets our nod.

Compaq
@ www.compaq.com.au

✔ Rugged build quality; respectable specs.
✖ Too expensive when compared to the Toshiba.

Pioneer DreamBook Lite

Light and long-lasting, but don't treat it too roughly.

It's refreshing to see a netbook on the market that doesn't use Intel's Atom chip as well, with the VIA C7-M playing first fiddle here in Pioneer's DreamBook Lite IL4. The 1.6GHz clock speed of this chip is plenty fast enough to handle a few productivity applications within the Windows XP OS, and even the odd bit of DivX viewing. The UniChrome Pro II graphics chipset is just fast enough for low-resolution movies, but you can forget all about gaming or intensive video editing. The lack of an optical drive could be a royal pain in your child's posterior in the classroom — unless your school has phased out CD-ROMs and DVDs, your kid is going to be stuck copying files via the wireless connection or USB key. If they're using wireless the DreamBook has 802.11a/b/g installed. The fact that this netbook is so tiny could be a major plus for humans with smaller frames. Weighing just 1.3kg, and small enough to fit inside even the cutest backpack, this is by far the most portable computer in the roundup. Even though the keyboard is smaller than usual, we reckon kids (with their smaller fingers) will soon get the hang of it — we just wish it was a little bit tougher, as it felt as if it wouldn't last too long in the punishing battlefield that is the school playground. Battery life was fantastic, outlasting all other contenders, with a time of three hours and 10 minutes when streaming a movie from the hard drive. If your child's school has ditched DVDs and CD-ROMs, instead switching to Wi-Fi, and you trust your baby not to use the keyboard as a cricket bat, the DreamBook is actually rather good value for money, and covers all of the necessary bases a student could need.

Pioneer
@ pioneercomputers.com.au

✔ Tiny; cute; functional.
✖ No optical drive.

Toshiba L300 Satellite

The hardiest laptop we tested, and a bargain price as well.

If you're smart enough to take advantage of the cashback offer, this solid little Satellite will set you back a mere $850. This makes it only slightly more expensive than the Pioneer netbook, but to our surprise you get a whole lot more for your money. The respectable 15.4in screen weighs in with a decent 1,280 x 800 resolution. At the highest brightness it doesn't quite match the Compaq and suffers a little from uneven backlighting, but not to the point that your kids will have an excuse for not doing their homework. The full-sized keyboard lacks a number pad, but has the sturdiest build of all the laptops in this roundup and is very comfortable to use. The touchpad is accurate and easy to use, though the buttons are a little tight to the touch. Optical drives must be around the same price as potato chips these days — we certainly weren't expecting a full DVD+RW burner at this price point, but the L300 includes one. Delving under the hood we were pleasantly surprised by the 2.16GHz Core 2 Duo CPU and 2GB of memory. Windows Vista Basic ran fine on these modest specs. However, the 140GB hard drive will be filled up with MP3s and DivX rips in no time, so we suggest going for a larger HD during purchase. Similarly, the underpowered Intel integrated graphics mean recreational use for the L300 will be limited to MySpace and Facebook rather than Crysis and Warhammer. With a battery life of 2:10 while playing a movie from the hard drive, we reckon you'll easily stretch 5 or 6 hours out of it if you stick to Word and Internet Explorer. We're very impressed by the L300. It's a laptop that shows you needn't sacrifice quality to cost rock bottom, and as a result we have no hesitation in recommending it to those on a budget.

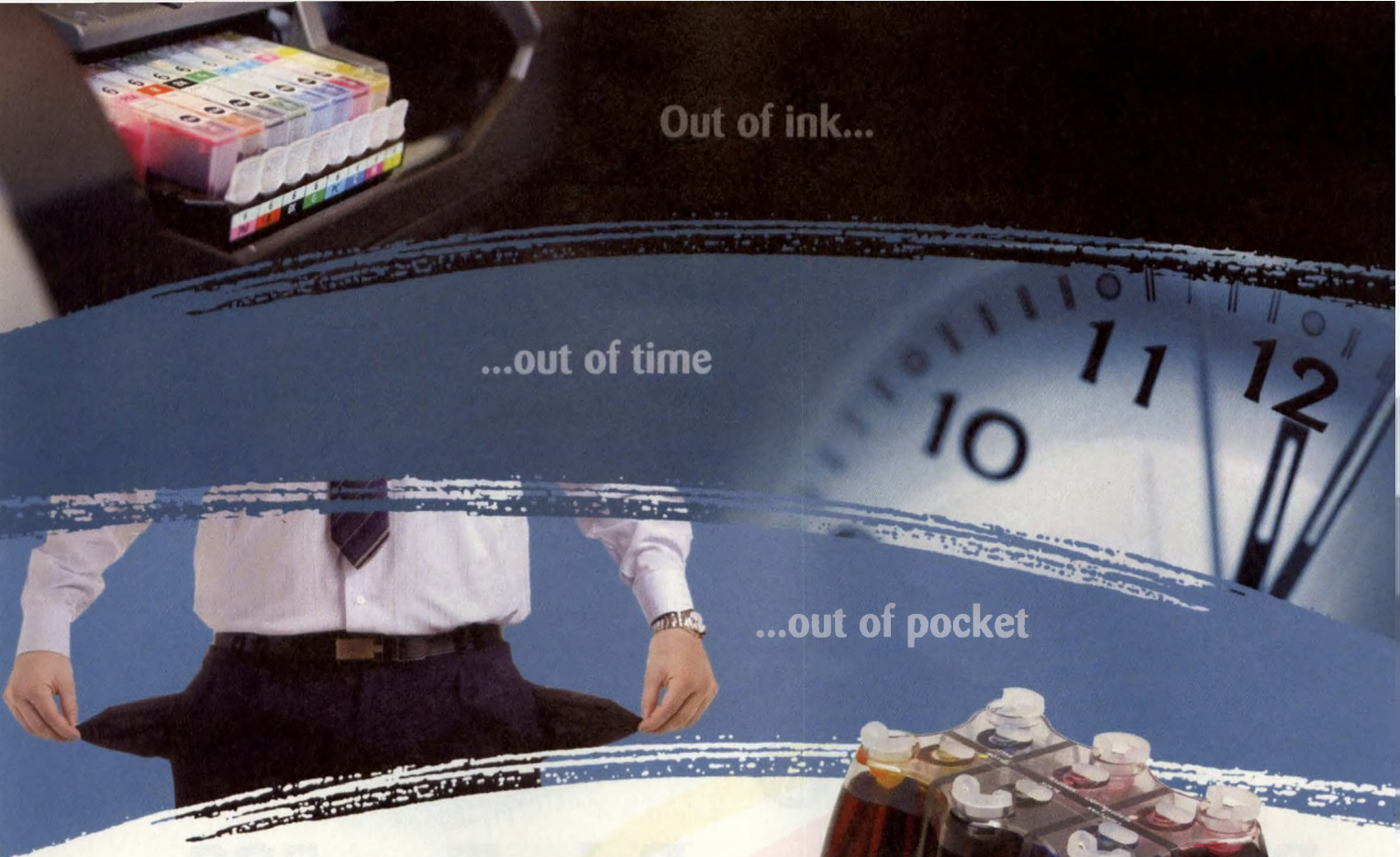
Toshiba	✔ What a bargain; not too heavy; rugged construction.
www.toshiba.com.au	✖ Small hard drive; slow graphics.

BlackBerry Pearl Flip 8220

Multimedia and communication, now in a clamshell style.

With the latest multimedia and productivity updates to the BlackBerry OS, it's become an attractive platform not just for business users but everyday consumers also. The Pearl Flip leverages off the popularity of clamshell-style mobiles, and offers the full functionality of a BlackBerry to those on tighter budgets. Flipping the phone open reveals a 2.6in portrait-oriented display on one half and the same hybrid QWERTY/numeric keypad found on other phones in the Pearl range on the other half. The keypad takes a while to get used to but, once you do, the combination of SureType predictive text and a system-wide spellcheck mean you can hammer out long passages of text fairly quickly. Unique to the Pearl Flip (compared to other BlackBerrys) is a smaller screen on the outer shell. By default, this displays an analogue clockface, but it'll also show new calls and messages, as well as display track information when you're using the music player. Most of the time, you won't even need to flip open the phone to use it — you can read new messages from the external screen as they come in, and skip through music tracks using the side-mounted buttons. Once again, 3G has been left off the menu, but you do get the benefit of 802.11b/g Wi-Fi for surfing the net, chatting and downloading email over a wireless network. The BlackBerry's speciality may be email, but it's a strong performer when it comes to web browsing, instant messaging and multimedia as well. Documents To Go Standard Edition lets you view and edit (but not create) Word, Excel and PowerPoint files. One catch is you'll have to sign up for a BlackBerry-specific plan to use any of the data apps. The cheapest is Telstra's: $29.95/mth for unlimited data on a 24-month contract.

Mobicity	✔ Built-in Wi-Fi; external screen; comfortable keypad.
www.mobicity.com.au	✖ No 3G/HSDPA; need to sign up for BlackBerry service.



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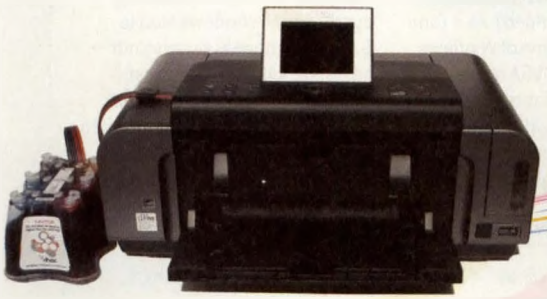

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Palm Centro

The cheapest smartphone on the market — and a great deal.

Palm may have unveiled its long-awaited webOS earlier this year, but smartphones running the original Garnet Palm OS are still rattling around if you're looking for a bargain. And why not, with thousands of compatible Palm applications that cover everything from homework trackers and dictionaries to unit conversion tools and calculators. Even without downloading any extra software, the Centro has most of the standard bases covered: Blazer for surfing the web, Versamail for email, Documents To Go Professional Edition 10 for creating, viewing and editing Microsoft Office files, and the usual PIM programs that sync with Outlook. Available for $299 prepaid with Telstra, the Centro is easily the cheapest smartphone currently on offer — but you wouldn't know it by looking at it. A sturdy white plastic shell, silver accents and a contoured back give it the feel of a more expensive smartphone, so it's really only the lack of 3G and Wi-Fi that hold it back. Still, that's not as much of a hindrance as you'd expect: videos from YouTube streamed smoothly after taking only a couple of seconds to buffer, and since Blazer presents the text of the page first (and loads the images and formatting afterwards), you can start reading pages almost instantly. Another point in the Centro's favour is its ease of use. The home screen uses a simple 4 x 3 grid of icons that you select using the five-way navigation pad or by tapping on the touchscreen, and program options are easily accessed with the dedicated Menu button. The keyboard is another kettle of fish; it's so small that you end up mashing all the keys while you're typing. We were able to get used to it after a day or so of practice, but your mileage may vary depending on how large your hands are.

Telstra	✔ Affordable; compatible software; attractive design.
@ www.telstra.com.au	✖ Cramped keyboard; no Wi-Fi or 3G; dated OS.

Palm Treo 500v

Who said oldies can't compete? This one is up there with the best.

Launched well over a year ago, the Treo 500v is an oldie but definitely still a goodie. It's one of the only sub-$500 smartphones to offer 3G (but not the faster HSDPA standard), and it runs the powerful Windows Mobile 6 Standard OS with all of the corresponding software: IE for web surfing, Office Mobile for working on documents, spreadsheets and presentations, and Outlook Mobile to keep you organised. Looks-wise, the 500v has a virtually identical design to the Palm Centro, only larger and in a charcoal grey finish. The upshot of this is more room for the QWERTY keyboard, which we found more comfortable than the Centro to use for extended periods (although it's still relatively cramped). As it runs the Standard version of Windows Mobile, the 2.5in QVGA display isn't a touchscreen — instead, you use the five-way navigation pad and two soft keys below the display to navigate through the menus. Altogether, we found this more efficient than a touchscreen, as it's easier to use the phone one-handed. Unique to the Vodafone version is a handy menu bar on the Today screen that you can scroll through to access your data, multimedia and apps without having to dig through the menu system. Our only qualm is that it's laggy, and it's a complaint we have with the system in general; despite running a respectable 416MHz Marvell PXA270 processor and 256MB of RAM, launching applications and inputting text was consistently sluggish. Another point worth mentioning is that there's no upgrade available for bumping the 500v's operating system up to Windows Mobile 6.1, which means you miss out on goodies like threaded text messaging, a new sliding panel screen layout for the Today screen and a zoom function in Internet Explorer Mobile.

Vodafone	✔ 3G connectivity; powerful OS; slick launcher.
@ www.vodafone.com.au	✖ Sluggish performance; doesn't run latest OS.

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iCAR

Want to connect your iPod to your car's stereo but confused about all the options? APC's guide will set you straight.

It was just a few years ago that in-car entertainment meant car radio and cassettes or CD players. Now it's all about the iPod, and even the iPhone. But not every car sound system gives an easy way to plug in an iPod. As a result, there are at least seven options for hooking up an iPod (and similar MP3 players) to your car, ranging from the ideal to the convenient.

THEY INCLUDE:

1. Direct connection
2. CD changer port
3. Auxiliary port
4. Bluetooth connectivity
5. iPod FM transmitter
6. iPod FM modulator
7. Cassette adaptor

Sony's CDXGT970US lets you control an iPod with its joystick controller.

IPOD DIRECT CONNECTION

Many car sound systems now support direct connection with an iPod via an iPod 30-pin connector cable or a USB cable. This is the best possible link between your iPod and your car's head unit. The head unit effectively takes over your iPod and lets you control it using the head unit's buttons and display. You can browse your playlists and play songs on the car stereo as if the iPod was built directly into your car.

Many new cars' head units come with a direct iPod connection, but there is also a big range of aftermarket units that have direct iPod connectivity. These typically start at around $200 with not much more than a radio and CD changer, but prices get more expensive when more features turn the head units into fully-fledged in-car entertainment systems. These include USB connections for USB keys or drives, Bluetooth connectivity, CD changer ports and so on. The more expensive head units feature integrated video screens and GPS navigation and can cost you well above $3,000.

The terminology used for head units can be confusing. Sometimes called source units, head units generally come with a radio and/or CD player, but when they don't, they are referred to as digital media receivers. These are still head units, but with a different tech mix.

Head units also come in two basic sizes: single-DIN, the dimensions of a standard car radio, and double-DIN, double the size normally to accommodate electronic screens.

We've looked at some of the best head units on the market with direct iPod connections.

SINGLE-DIN HEAD UNITS

Clarion's $360 DXZ586USB is a good example of a classic all-round CD-playing head unit with the ability to connect an iPod or USB-stick loaded with your MP3s. Once plugged in, the iPod can be tucked away out of sight as the CD player is now in control.

The display on the Clarion DXZ586USB doubles as an input device, allowing you to adjust the volume, change the radio station or song all with a swipe of your finger. There's also a remote control and a number of buttons on the faceplate for adjusting presets and equalizer settings.

Purchase a separate BLT370 receiver unit which clips onto the sun visor and you can wirelessly stream music from a Bluetooth enabled mobile phone or answer a call and hear the person you are talking to from your car's speakers. The next model up is the $499 DXZ586US and for that you get better sound technology and a superior display.

Alpine's $399 iDA-X200 Digital Media Receiver is an example of a head unit whose marketing focuses around its iPod connectivity. Sony's CDXGT970US lets you control an iPod with its joystick controller, which allows you to navigate through large song libraries and multiple settings all with the one knob. It also comes with built-in Bluetooth connectivity as well as three sets of preamp outputs — ideal if you want to connect it up to an amp and squeeze more power than the standard 52 watts per channel. Entry-level iPod compatible head units like JVC's CD playing KD-PDR45 retail for around $200.

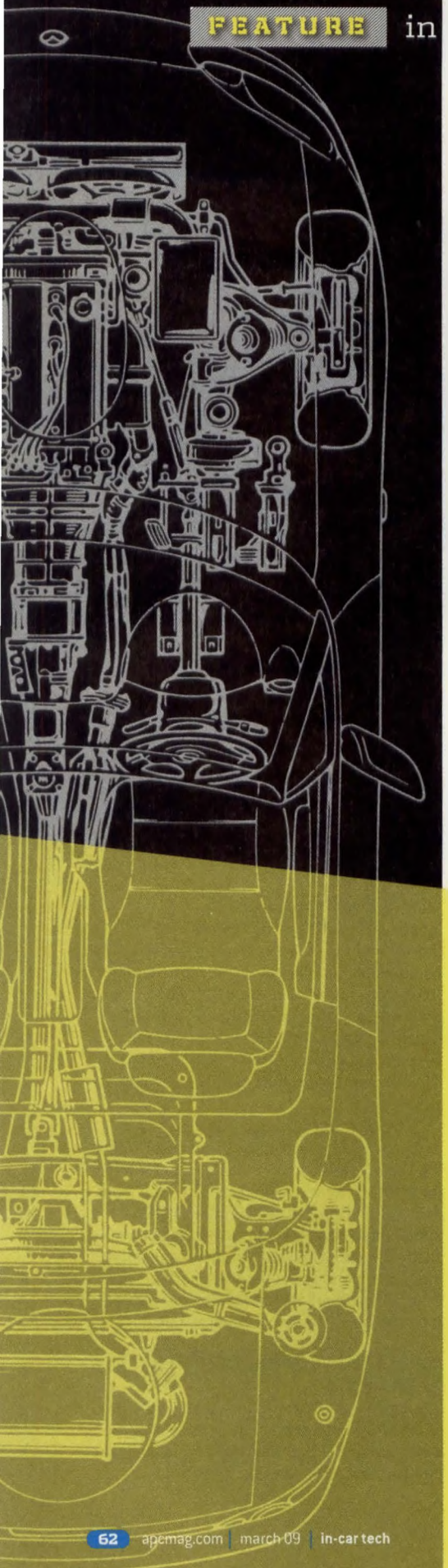
DOUBLE-DIN HEAD UNITS

When you get into double-DIN territory, the iPod-compatible head units are generally comprehensive entertainment centres, often featuring integrated GPS and DVD video playback. An example is Eclipse's AVN6000, which includes a GPS, a 6.5in touchscreen, two DVD players built-in amplifier (50 watts x 4) and five preset digital sound processing (DSP) settings.

Be aware that although a head unit is expensive it's not necessarily equipped with an iPod connection as part of the package. For instance, Pioneer's $3,799 AVIC-HD3 is a great example of a top end head unit, with GPS, audio/video playback and built-in hard-drives (with CD-ripping and storing software), not to mention Bluetooth connectivity and vehicle information feedback as well. But for the iPod, it comes with an optional adaptor. Huh?

DIRECT IPOD CONNECTION: GPS NAVIGATORS

You can actually listen to your iPod songs via some GPS navigators, such as the TomTom Go 720. With an optional iPod connector, you can control the iPod via the Go's interface.



CD CHARGER PORT

Another direct connection option is an iPod adaptor which connects to the head unit's CD Changer port. The port is usually located on the back of the head unit and is normally used to connect to an external CD-changer elsewhere in the car.

An advantage of using CD Changer connections is the good quality sound and the ability to control your iPod via your head unit, and charge it, too.

Generally, the CD Charger port adaptors can't be mixed and matched with different brands. You get them from the maker of the head unit and even then you need to make sure the adaptor is compatible with the particular model of head unit.

An example of a CD Changer adaptor is JVC's KS-PD100 Interface Adaptor for iPod. The $149 adaptor works with most JVC head units with CD changer controls, enabling you to play your iPod from the head unit controls or with the JVC remote to control. It also charges the iPod's battery while it's connected.

JVC's KS-PD100 works with most JVC head units with CD changer controls.

Harman/Kardon's Drive and Play Kit lets you control your iPod more easily.

AUXILIARY PORT

Head units which don't have a direct connection (using the iPod's 30-pin dock connector or USB cable) may have an AUX in jack. Here, you use a standard audio cable to link the iPod's 3.5mm earphone jack to the head unit' AUX port.

This is the simplest and cheapest way to connect your iPod to a head unit. The downside is that you enjoy none of the control or display options that you get with direct connections. While you can adjust the audio properties via the head unit, you can't navigate through albums or change songs. Your car sound system is being used for simple audio playback while you still fiddle with your iPod's controls when driving.

But there are variations on the theme. Some auxiliary connection solutions provide the option for controlling your iPod more easily. One is the $90 Kensington LiquidAUX Deluxe, which has a wireless remote control that attaches to the steering wheel, making the iPod easier to manage while driving. It also adds a dock and a charger, since auxiliary connections don't charge the iPod.

Another option is the $50 Harman/Kardon Drive and Play in Car iPod Kit, which adds its own display so that you can control the iPod more easily, as if you were doing so via a direct iPod connection to head unit.

Connect the Drive and Play into your car's power socket, drop the iPod into the Drive and Play kit's cradle, attach the big backlit display to the dashboard and connect the whole thing to the head unit via an auxiliary connection .

The Drive and play also lets you connect via FM transmitter (see iPod FM transmitters further on).

THINGS YOU WANT IN A HEAD UNIT

If you're in the market, look for one with a direct iPod connection. But while you're at it, a good head unit should also have the following

AUXILIARY PORTS

These are 3.5mm jacks that are indispensable for connecting to a huge range of head unit accessories and peripherals.

USB PORTS

Lets you plug USB or hard drives into the head unit and play music off them. Look for USB inputs on the front of the head unit panel. Ones at the back are harder to get to.

BLUETOOTH

This not only provides hands-free calling with phones, but also lets you stream music from your phone or iPod to your head unit.

CD CHANGER PORTS

These not only link to CD changers, but can be used by many different peripherals to connect your car's sound system.

BLUE-TOOTH CONNECTIVITY

With many head units now available with Bluetooth inputs, you can buy an iPod Bluetooth adaptor that will stream music from your iPod to the car's sound system. This is a dongle that connects to the iPod's dock connector.

An advantage of a Bluetooth connection is that you're able to control the iPod via your head unit, and the sound quality is the best that can be achieved outside of a cable connection. A downside is that it doesn't charge the iPod.

CASSETTE ADAPTOR

This is Grandpa's solution for his old Kingswood: a cassette adaptor is a special connector that looks just like a cassette, but with a 3.5mm cable that links to your iPod. Music plays through your car stereo the same way it does from a recorded cassette in full stereo sound. You also don't need to plug the cassette adaptor into a power source.

The downside is that you have to use the iPod itself to navigate through the songs — which may not be ideal when driving.

FM MODULATOR

An FM modulator sends FM signals to the head unit but connects directly via cable to your car's aerial, bypassing the radio's reception to send a perfetly clear signal from your iPod to the head unit (as well as the other radio station channels). But it's a complicated way of getting your iPod's sound into your car's system: an auxillary connection would be easier and probably sound better. FM modulators such as the Clarion FM 200 Modulator are sold by some car audio retailers, but this solution is not common.

IPOD FM TRANSMITTER

FM radio transmission is a convenient and popular way of connecting iPods to car sound systems that don't have direct cable or Bluetooth connections. An iPod FM transmitter plugs into your cigarette lighter and broadcasts the iPod's music to the car's radio. Plug the iPod FM device into the cigarette lighter, tune the radio to the right frequencies and you have your own mini-radio station. The signal is weak so it can only be picked up over a few metres.

The main advantage of iPod FM transmitting is convenience, since it will work with any radio, but the drawback is that sound quality will be that of FM radio at best. That's good enough for many people but not audio buffs. Cable connetions provide better quality, and you may experience cross-talk or even lose the frequency when you are driving around (in which case you have to retune the transmitter and radio onto a new frequency). (And you need to use your iPod for playback control.)

But since they are a cheap and convenient solution, iPod FM transmitters are very popular. An example is Belkin's $99.95 TuneCast Auto with ClearScan. The ClearScan technology tries to remove the frustration of manually retuning to find a clear FM channel. Hit the button and ClearScan quickly scans and finds the best available FM frequency. Another similar and very popular FM transmitter is the $79.95 Griffin iTrip.

A fancier iPod FM transmitter is Alpine's eX-10. This device has a small 2.4in screen that displays iPod music search options and album artwork and simply mounts to the dash using double-sided tape. Connect your iPod to the main unit (which plugs into your car's cigarette lighter) and tune your radio to a preset FM frequency and you're away. The sound of the eX-10 is very good although it will never match a direct connection.

Belkin's ClearScan technology aims to minimise radio-tuning frustration.

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The 2009 Subaru Impreza WRX offers options of leather seats with electric sunroof, satellite navigation or the combination of leather seats, electric sunroof and satellite navigation.

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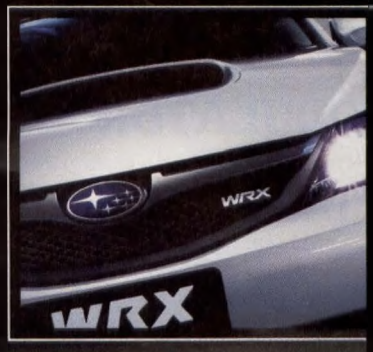
- Front sports bucket seats with red stitching



TURBOCHARGED BOXER ENGINE

The 2009 Subaru Impreza WRX's 2.5-litre turbocharged engine now produces 195kW of power at 6000rpm and 343Nm of torque at 4000rpm. The maximum turbocharger boost has increased engine power to 93kPa. A revised exhaust system provides a 30% reduction in gas flow restriction, to match the turbocharger performance and increased engine power. The 2009 Subaru Impreza WRX is 15.4% more powerful and is faster 0-100km than ever before.

SUSPENSION & TYRES

The 2009 Subaru Impreza WRX is biased towards sports handling, while retaining good ride comfort, grip & stability. The coil springs, stabilizers and top mounts are stiffened and roll rigidity increased to improve maximum lateral G and turning ability. Fine tuning of the damping forces in the shock absorbers provides linear response with minimal delay when steering. The 2009 Subaru Impreza WRX is fitted with Dunlop SP Sport 01 225/45 R17 tyres and 17 x 7JJ alloy wheels, with increased width from 205/50 to 225/45 matching the more aggressive sports handling.

SAFETY

Subaru is a leader in both accident avoidance and protection, having achieved the maximum five-star ANCAP[2] occupant safety rating for every car in their range. All Subaru vehicles feature Symmetrical All-Wheel Drive, offering maximum traction in all conditions, six airbags (dual front, front side and curtain airbags) and VDC electronic stability control as standard, offering an extra level of control in high-risk situations.

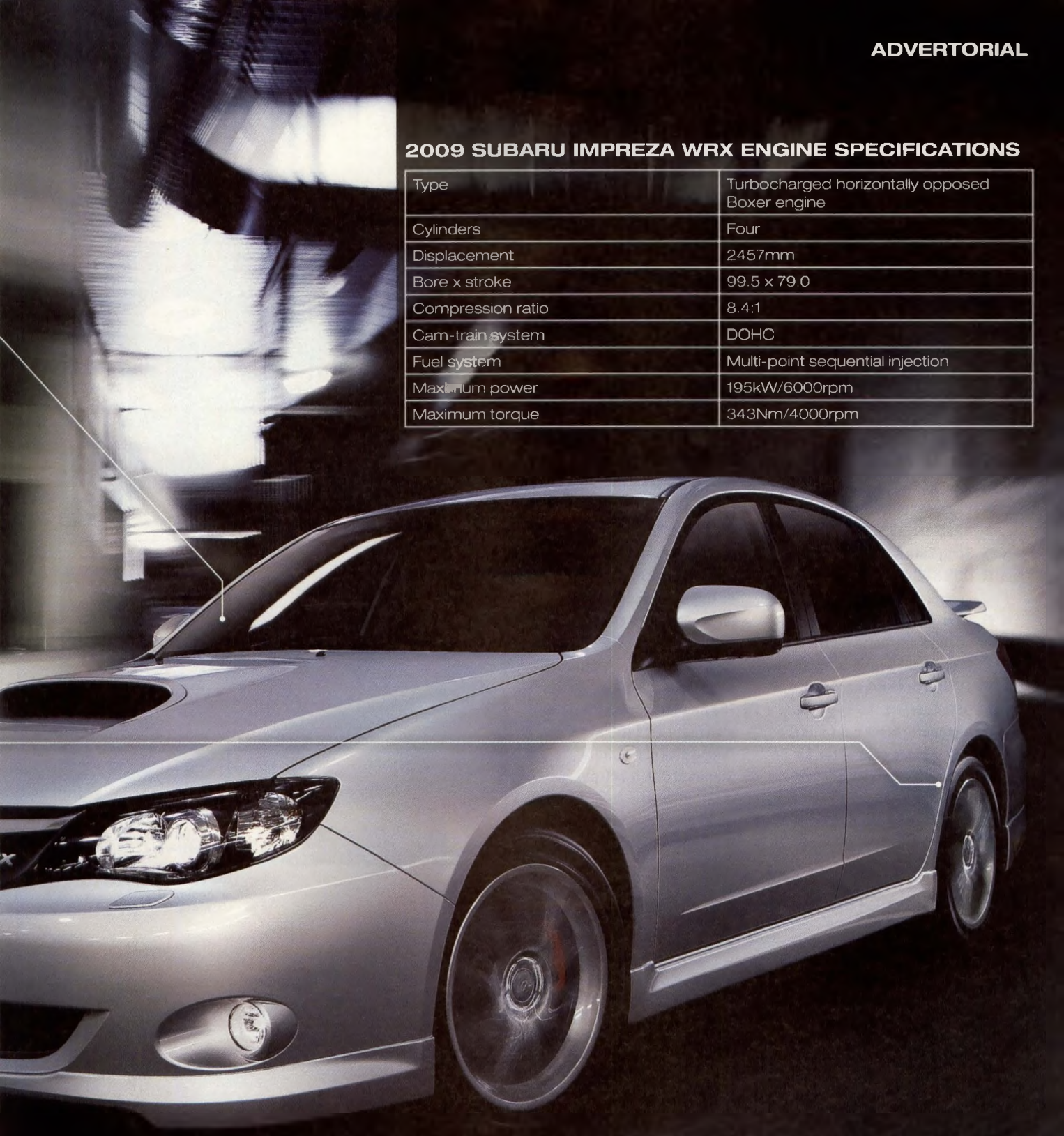
FUEL EFFICIENCY

Fuel consumption (L/100km) combined	10.4
Carbon dioxide (g/km)	247
Fuel tank capacity	60 litres
Minimum fuel requirement	95 RON

1. Not available where optional satellite navigation is installed. 2. Rating by Australasian New Car Assessment Program.

2009 SUBARU IMPREZA WRX ENGINE SPECIFICATIONS

Type	Turbocharged horizontally opposed Boxer engine
Cylinders	Four
Displacement	2457mm
Bore x stroke	99.5 x 79.0
Compression ratio	8.4:1
Cam-train system	DOHC
Fuel system	Multi-point sequential injection
Maximum power	195kW/6000rpm
Maximum torque	343Nm/4000rpm



THE NEW SUBARU IMPREZA WRX

The next generation of Subaru performance, like you've never seen it before – the new generation 2009 Symmetrical All-Wheel Drive Impreza WRX. Its explosive power is matched by superior safety and unparalleled precision handling capabilities. With lower fuel consumption and the option of either sedan or hatch from $39,990 RRP[3] (plus dealer delivery and statutory charges[4]) the new Impreza WRX heralds the rebirth of advanced driving technology and performance.

Test drive the new 2009 Subaru Impreza WRX today – visit your local Subaru Retailer or **www.subaru.com.au/wrx**

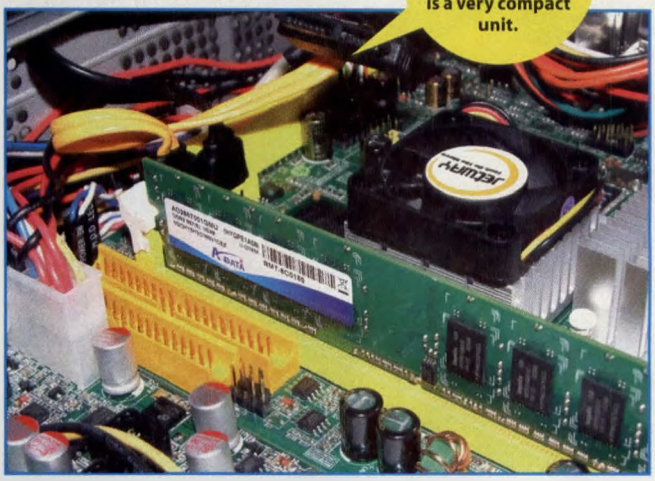
SUBARU
ALL-WHEEL DRIVE

3. Price is the manufacturer's recommended retail price only and may vary between Retailers. Dealer delivery and statutory charges are additional. Vehicles may only be purchased from Authorised Subaru Retailers. 4. Dealer delivery charges vary between Retailers. Statutory charges (Registration, Compulsory Third Party Insurance and Stamp Duty) vary depending on the purchaser. Ask your Retailer to confirm dealer delivery and statutory charges.

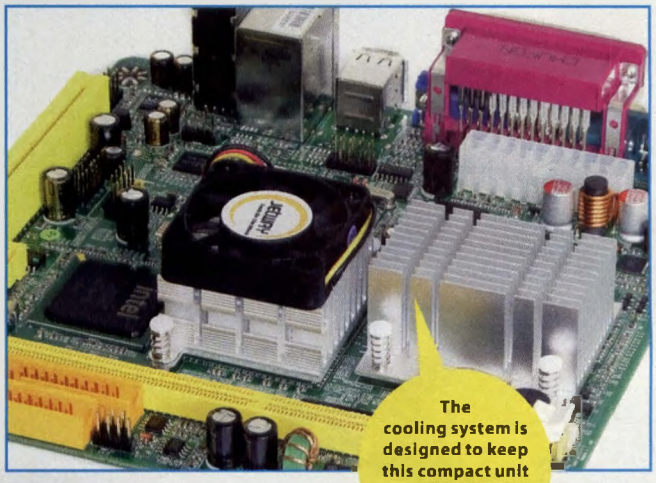
exploding tech

No. 32 The DreamVision Mini PC J230 from Pioneer Computers Australia is one of the first built to work with Intel's new dual-core Atom CPU designed for low power, low noise environments.

1. The J230 uses a 2.5in Sata II hard disk of up to 500GB.
2. Active cooling system for the Intel 945GC Chipset.
3. Passive cooler for the Atom N230 or N330 CPU.
4. Sony Sata II DVD RW Drive.
5. DDR II 800 RAM module, supporting up to 2GB.
6. Line In, Line Out and microphone ports for the Realtek HD Sound Card.
7. 10-100 network card and USB II ports 1-4.
8. Connector block contains the D-SUB video connector, as well as the parallel and com ports for legacy devices.
9. PS2 keyboard and mouse connectors.
10. The unit has an internal PCI slot, however certain height restrictions apply.
11. The Intel ICH 7 Southbridge.
12. Intel 945GC Chipset.
13. The Intel N330 dual-core CPU might appear small but with advanced architecture such as Hyper Threading it can pack quite a punch.
14. The J230 is run off a 100W PSU, powered by an external 12V AC adapter.
15. The motherboard in the J230 also features 1 IDE and 1 floppy disk connectors.
16. Standard DDR II 240 pin memory DIMM.
17. USB Ports 5-6 which mount in the front of the case.



The smaller sized notebook mini-Sata connections save space in what is a very compact unit.



The cooling system is designed to keep this compact unit cooled with a minimum of noise.

The DreamVision J230's dimensions are 210 x 258 x 65mm

Pioneer DreamVision mini PC J230

Tiny PCs such as the DreamVision Mini PC J230 can be used as replacements for a full-sized PC when used for basic office applications, but in general they are ideal as the base for set-top boxes, thin clients, in-car PCs, and point of sale (and Kiosk) applications.

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SONY NEC 6X DVD/DUAL/RW S-M
AD-7560S
PIONEER

Best tech

APC's independent reviewers point to the best technologies in the top-selling product categories each month. We only change products when a better one comes along. What you see here is the best technology available on the market right now.

Movers & Shakers

New tech on the move

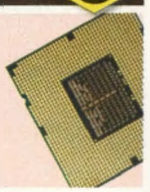
You will notice that Seagate drives have disappeared from the internal hard drives category after appearing last month. More issues with some Seagate drives have come to light which have forced the company to send out yet more firmware updates to users. While this may not affect all users, it makes us shy away from recommending the drives.

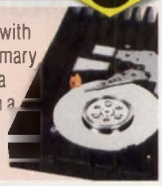
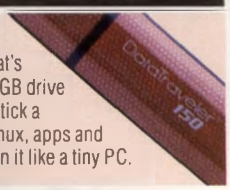
LOOK OUT FOR THESE

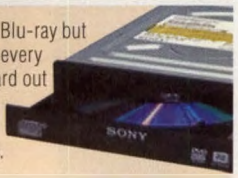
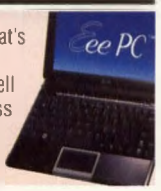
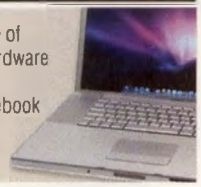
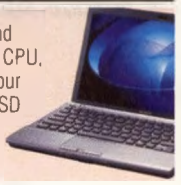
NEW

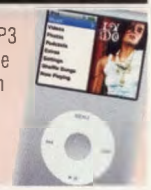
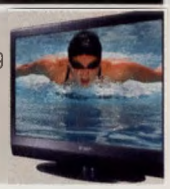
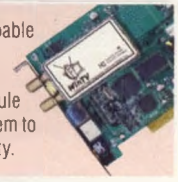
Products marked with this stamp are the latest additions to Best Tech.

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
GENERAL PC	**Altech NRG Storm** NEW Altech keeps updating the Storm. Now powered by Core i7 Extreme Edition 965 chip, plus 12GB of DDR3 triple channel memory and 3 GeForce GTX280 cards. **$7,999 > altech > altech.com.au**	**Dell Inspiron 530 E5200** NEW We just can't go past Dell for value here — dual-core processor, 3GB of RAM, Vista, now 500GB HDD, Vista and 20in widescreen monitor — all for around $1,000+. **$1,099 > Dell > dell.com.au**	**TI Extreme Power 920** Brilliant high end system based on 2.76GHz Core i7 920 chip, Gigabyte EX58 Extreme board, 3GB of Corsair RAM and two 1TB hard disks — half the price of similar monster PCs. **$3,250 > Trinity Int. > ticocomputers.com.au**
HTPC	**Sony VAIO VGX-TP2G** Adventurously designed media centre PC. No screen as it assumes you will connect it to a TV with its HDMI port. Has a 2.1GHz Core 2 Duo and 500GB HDD. **$2,399 > Sony > www.sony.com.au**	**HP Touchsmart IQ500** NEW This is the closest the PC world has to the iMac, with a touchscreen that reminds you of the iPod touch. Great, no-fuss home theatre PC. **HP > $2,499 > hp.com.au**	**HP Touchsmart IQ800** NEW HP has really nailed the concept with the IQ machines. The IQ800 is the closest thing to a merger of the PC and TV. Full HD screen, TV tuner, Blu-ray player. **HP > $3,799 > hp.com.au**
TINY PC	**Dell Studio Hybrid** PCs are clearly tired of being branded boring. But like Apple, Dell expects a premium for these designer pill-shaped low-power PCs. **$2,135 > Dell > www.dell.com.au**	**DreamVision Atom Mini PC** NEW One of the first based on Intel's Atom dual-core CPU. Add a 2.5in hard drive and you have a mighty mite PC. **$399 > Pioneer > Pioneercomputers.com.au**	**ASUS Eee Box B202** ASUS has taken its enormously successful Eee PC concept and applied it to a desktop. Atom-powered, 1GB of RAM and 80GB drive. **$429 > ASUS > www.asus.com.au**

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
CPU	**Intel Core 2 Duo E8600** NEW Most expensive of Intel's dual-core CPUs, but in many single processing benchmarks is superior to the older quad-core Q line and doesn't need an X58 board. $420 > Intel > Intel.com.au	**Intel Core 2 Duo E8200** NEW It's a price thing. The E8200 is the first in the Core 2 Duo range to offer an FSB of 1,333 MHz and 6MB of cache memory: enough for a powerful all-round system. $220 > Intel > Intel.com.au	**Core i7 920** NEW The baby of the new Core i7 family blows away its Intel predecessors in anything requiring multi-processing. Needs X58 chipset motherboard.  $460 > Intel > Intel.com.au
MOTHER BOARDS	**Gigabyte GA-EX58-DS4** NEW Want to get into Core i7 computing on a budget (relatively speaking)? The cheapest X58 board for Intel's new CPUs. $330 > Gigabyte > gigabyte.com.au	**ASUS P5QL-E Motherboard** Most of the goodies of a good motherboard but at half the cost. Great performance, 400MHz overclocking, with speedy frontside bus and newer PCI 2.0 Express. $130 > ASUS > www.asus.com.au	**Gigabyte GA-EX58-Extreme** NEW The newest and most powerful motherboard, supporting Intel's Core i7 quad core CPUs and Triple channel DDR3. It forms the basis of the fastest PCs being built. $530 > Gigabyte > gigabyte.com.au
GRAPHICS CARDS	**Sapphire HD 4870 GDDR5** NEW It was the fastest consumer card on the market, until now. But still blazingly fast. Based on the ATI R700, in double GPU configuration. $449 > Sapphire > www.sapphiretech.com	**MSI HD 4830** NEW The baby HD 4000 series card is excellent for gamers sitting on a screen that handles up to 1,920 x 1,200. $159 > MSI > msi.com.tw	**Gigabyte GTX 295** NEW Nvidia's new fastest consumer graphics card dethrones the HD 4870 X2 with its two GeForce GTX 200 GPUs on a single card, SLI support, PhysX effects, 3D and more. $860 > Gigabyte > gigabyte.com.au
RAM	**Kingston HyperX PC3144001** NEW Entry level DDR3 RAM that's NVIDIA certified, meaning the kit will achieve the rated speed on a 790i chipset. Tests show it runs stably in an intensive environment. $299 > Kingston > www.kingston.com	**Team Extreem Dark 6400** NEW An aggressively priced low latency DDR2 kit that packs a whopping 4GB across two sticks. More than enough for most gamers. $130 > Team Group > teamgroup.com.tw	**G.Skill PI Black DDR3** NEW A high-performance memory kit that offers good speed and high capacity for the Core i7 user who's looking for nothing but power. $600 > GSkill > gskill.com
PSU	**Enermax Modu82+ 625 Watt** NEW A mid-range PSU separated from cheaper power units by its high efficiency. Between a 20-100 per cent load, will achieve a 82-88 per cent efficiency. $300 > Rectron > www.rectron.com.au	**Corsair HX-520** NEW Designed to offer enough power for most gamers, the HX-520 has all those nice PSU features we love at a good price. $140 > Corsair > corsairmemory.com	**Thermaltake ToughPower 1500W** Delivering a monster 1,500 watts. If you're going to run high-end graphics cards in SLI or Tri SLI mode, this is the power unit you want, with 100 amps split across four rails. $519 > Thermaltake > www.thermaltake.com
COOLING	**Noctua UHP 12 CPU Cooler** NEW A CPU cooler that includes dual heat pipes, premium 120mm fans. Recorded idle temps for an Intel quad core Q6600 of 27c/30c/26c/22c, and when gaming, 41c/45c/44c/40c. $98 > Noctua > www.noctua.at	**Thermalright Ultima-90** NEW A less hard-core and more budget-friendly Thermalright cooler that manages to shave a few degrees off your CPU. $60 > Thermalright > Thermalright.com	**Thermalright Ultra Extreme** NEW With six heat pipes and spring-loaded bolts to attach tightly to a socket, this cooler is so good you don't need to bother with water-cooling. $75 > Thermalright > Thermalright.com

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
CASES	**Antec Nine Hundred Two** NEW Antec has updated its classic gamer's case, improving the already over-the-top cooling and adding better cable management and an inside paint job. $220 > Antec > www.antec.com.au	**Thermaltake Spedo Advance** A big black steel case with many features for the price, lots of bays, slots and ports — and a transparent side panel to show it all off. $299 > Thermaltake > www.thermaltake.com	**Lian Li Armorsuit P80** A Super Full tower in black brushed aluminium, with a removable motherboard tray and plenty of room. Big iron for serious PC builders. $595 > Lian Li > www.lian-li.com
MONITORS	**Lenovo ThinkVision L220x LCD** Great image quality for the price. Comes with support for 1,920 x 1,200 that's higher than the 1,680 x 1,050 you usually find in anything under $1,000. $998 > Lenovo > Lenovo.com.au	**AOC LCD 2219 P2 22in** A sensational 22in 1,680 x 1,050 display that's fully height-adjustable and tiltable through a 25-degree range and is able to rotate from landscape to portrait. $349 > AOC > www.aocmonitor-anz.com	**Dell UltraSharp 3008WFP 30in** The display that makes geeks go weak at the knees: 30in of bright, sharp 2,650 x 1,600 screen with a full complement of modern connectors. $1,899 > Dell > dell.com.au
INTERNAL HARD DRIVE	**Intel X25-M SSD** NEW Fits into a 2.5in drive bay and is the fastest drive ever tested in *APC*'s Labs. No moving parts means it's twice as fast as a VelociRaptor. The ultimate PC drive status symbol. $900 > Intel > Intel.com.au	**Western Digital Caviar Black** NEW A month ago this was considered a premium drive, but with prices falling why not get the best? One terabyte and 32MB cache. We bought it and love it. $200 > Western Digital > www.wdc.com	**Western Digital VelociRaptor** NEW Fastest mechanical drive with 300GB. Should be the primary drive for OS and apps on a performance system, with a big fat secondary slower drive holding all the data.  $280 > Western Digital > www.wdc.com
EXTERNAL HARD DRIVE	**Seagate FreeAgent Xtreme** Doesn't have RAID mirroring but still gives you 1 terabyte of storage and Firewire, eSATA and USB 2.0. Plug it in and it's ready to go. Great price. $199 > Seagate > Seagate.com	**W D My Passport Elite** NEW A 500GB portable drive that's fast, looks great and fits in your pocket – and best of all can be picked up for around $200 on the street. $200 > Western Digital > www.wdc.com	**WD My Book Mirror** When you need storage for extremely valuable data the My Book Mirror gives you 1TB, using RAID 1. Should a drive fail, you still have a backup. No FireWire. $340 > Western Digital > www.wdc.com
USB KEYS	**Kingston Data Traveler Blackbox** Kingston again! They set the standard in USB key drives. This one comes with software that encrypts its contents to FIPS 140-2 Level 2 standard. $140 > Kingston > www.kingston.com	**Kingston Data Traveler 32GB** A 32GB USB key that's virtually a portable hard drive — stick hours and hours of video in your pocket. Incredible. Supports Windows & Mac. $140 > Kingston > www.kingston.com	**Kingston Data Traveler 64GB** Kingston's 64GB drive takes all that's good with the 32GB drive and doubles it. Stick a bootable USB Linux, apps and masses of data on it like a tiny PC.  $200 > Kingston > www.kingston.com
NAS HOME & OFFICE	**D-Link DNS-343 Four Bay NAS** Stick a drive in and it works without any special setup, it's quickly detected on the network, will send email alert if anything goes wrong. $850 > D-Link > www.dlink.com.au	**Freedom 9 freeStor 4020 NAS** A four-bay NAS with both Gigabit Ethernet and 802.11b/g connectivity. Also supports media streaming and can be used as an FTP server. Supports 1TB drives. $500 > Freedom 9 > www.freedom9.com.au	**Thecus N3200 Home NAS** A premium NAS offering incredible flexibility. Visible on the network with little futzing around, plus media server and iTunes server options. $1,770 > Thecus > www.thecus.com

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
OPTICAL BURNERS	**Lite-On iHAP322** NEW A blindingly-fast writing speed of 22x, but also the only burner which can permanently erase the content of DVD±R (DL) and CD-R discs – to wipe any confidential data. **$59.95 > Lite-on > www.liteonit.com**	**Sony DRUV200A** Doesn't burn to Blu-ray but can do virtually every CD/DVD standard out there. Also comes with Nero 8 software.  **$59 > Sony > www.sony.com.au**	**Sony BWU3200S Blu-ray** Burns to just about every disc format, from Blu-ray (up to 8x) and DVD to CD. With a SATA interface it's easily installed and works with XP or Vista. **$549 > Sony > www.sony.com.au**
NETBOOK	**Dell Inspiron Mini 12** With a 12in screen it's either the world's biggest netbook or the closest thing to a MacBook Air. An 80GB HDD, but only 1GB RAM. **$999 > Dell > www.dell.com.au**	**MSI Wind U100** Heaps of netbook for the price — 10in screen, 1.6GHz Intel Atom CPU and 80GB hard drive, as well as a generously sized keyboard for the class. **$600 > MSI > www.global.msi.com.tw**	**ASUS Eee PC 1000H** A netbook tour de force that's almost a notebook, with a full-sized keyboard, six-cell battery and 802.11 wireless networking. 1kg heavier than the MSI Wind.  **$699 > ASUS > www.asus.com.au**
NOTEBOOK ALLROUNDER	**Apple MacBook Pro 17in** The perfect marriage of software and fast hardware in a stylish design. Increasingly the notebook of choice for many professionals.  **$3,799 > Apple > www.apple.com.au**	**Dell Inspiron 1525** Core 2 Duo performance coupled with 2GB RAM and a 250GB HDD — good with Vista. **$999 > Dell > www.dell.com.au**	**Sony Vaio Z** Made of carbon fibre and aluminium, Core 2 Duo CPU, 4GB DDR3 RAM, six-hour battery life, 2 x 64GB SSD drives and 1600 x 900 13.1 in widescreen.  **$3,999 > Sony > www.sony.com.au**
DESKTOP REPLACEMENT	**Dell XPS M1730 (512MB Graphics)** Yes, notebooks can be serious gaming machines. This Dell comes with an NVIDIA GeForce 8700M GT graphics and SLI technology, 4GB of RAM and two 320 GB drives. **$3,999 > Dell > www.dell.com.au**	**Acer Aspire Gemstone Blue 8920G** Incredible 18.4in, 1,920 x 1,080 HD display. There's a Blu-ray drive and 5.1 surround sound. This Core 2 Duo T8300 machine is a 4.1kg head-turning beast. **$2,699 > Acer > www.acer.com.au**	**HP X18** Top-of-the-line portable media centre. With an 18.4in, 1,920 x 1,080 screen, a Blu-ray player, a DVB-T/Analogue TV-tuner and great speakers. **$3,899 > HP > www.hp.com.au**
SMARTPHONE	**HTC Touch 3G** If you liked the Touch Diamond but found it too rich, the Touch 3G is a cheaper alternative with most of the features, like Wi-Fi, GPS, 7.2Mbit/s HSDPA and 3.2 megapixel camera. **$799 > HTC > www.htc.com**	**iPhone 3G** Try as we might to find a worthwhile alternative, the iPhone is the best all-rounder smartphone — glorious UI, 3G speed, more apps, and still great pose value. **Plan > Apple > www.apple.com.au**	**BlackBerry Bold** The Bold is the most addictive BlackBerry yet, with built-in Wi-Fi and GPS, a stunning screen and DivX/XviD playback. It's still the best for email too. **Plan > RIM > www.blackberry.com**
GPS	**Uniden TRAX 430 GPS** Comms company Uniden has released a ripper of a GPS device, impressing with its ease-of-use, exceptional screen and ability to create 3D maps. **$379 > Uniden > www.uniden.com.au**	**TomTom ONE XL** The most affordable TomTom that delivers the features that matter, with the same display and navigation engine of the more expensive TomToms. **$399 > TomTom > www.tomtom.com**	**TomTom GO 930** The top-of-the-line TomTom delivers traffic messaging, intelligent live routing, FM transmitter, voice-recognition and text-to-speech. **$849 > TomTom > www.tomtom.com.au**

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
MEDIA PLAYER	**Sony Walkman NWZ-E436F** A good alternative to the iPod nano, the 4GB Walkman is a slim, great-looking player with a good UI and excellent screen. We think its sound quality beats the nano's. $129.95 > Sony > www.sony.com.au	**Apple iPod nano** A new long narrow design and with an accelerometer that kicks the nano into landscape mode when you hold it sideways. Now in 8GB and 16GB models. $199 > Apple > www.apple.com.au	**Apple iPod Classic 80GB** The number-one selling MP3 player of all time — with the most intuitive menu system and super iTunes software that combines downloads and music management.  $319 > Apple > www.apple.com.au
COMPACT CAMERAS	**Nikon Coolpix S710** With every feature you could wish for and some you've probably never heard of (like smile detection) the S710 is a bargain! $380 > Nikon > www.nikon.com.au	**Nikon Coolpix S550** Good, cheap and easy to use with all the useful features of its more expensive competitors. $250 > Nikon > www.nikon.com.au	**Canon IXUS 80 IS** Probably the best digital compact on the market, with every function you could ever need but still at a great price. $379 > Canon > www.canon.com.au
DSLR CAMERAS	**Canon EOS 50D** Although better than the 450D, the 50D's price stops it being in the Best Value category. Still not as good as the Nikon D90 but still a great camera by any means. $2,599 > Canon > www.canon.com.au	**Canon EOS 450D** The best low-price DSLR you can get. Suited to the amateur photographer, the 450D offers heaps of features in a tiny DSLR frame. Bargain! $949 > Canon > www.canon.com.au	**Nikon D90** This is just sexy! The first DSLR with HD video, the D90 is the best non-professional camera you could get without sending yourself broke. $1,699 > Nikon > www.nikon.com.au
HD CAMCORDER	**Kogan Full HD 1080p** While it's not in the Canon Full HD class, it's the only camcorder that delivers Full HD for anywhere near the price. Records in Mov format only, on an 8 GB SDHC card. $369 > Kogan > www.kogan.com.au	**Canon HV30** NEW Supports MiniDV tape – which means the Canon can record in full HD instead of AVCHD. And at $1,499, it's also incredibly cheap given its features. $1,499 > Canon > www.canon.com.au	**Sony HDR-FX1000** The ultimate camcorder. Basically a pro camera without some broadcast features, it records full HD on HDV (Mini) tape delivering unparalled quality. $5,999 > Sony > www.sony.com.au
HDTV	**Kogan HD 32 1080P** A 32in 1080p HDTV with HD tuner selling for $899 whose quality is as good as anything in that size. HDTV doesn't get any better than 1080p.  $749 > Kogan > www.kogan.com.au	**LG 42PG60UD** A very affordable, stylish, frameless 42in plasma HDTV with an excellent bright screen, lots of inputs and 100Hz true motion with industry-leading response time. $1,499 > LG > www.lg.com.au	**Sony Bravia W-series** One of the best LCD HDTVs: delivers great blacks, superb colour fidelity and great upscaling. $2,699 > Sony > www.sony.com.au
TV TUNER	**AVerTV DBT- Volar GPS USB Tuner** In a market filled with USB TV tuner sticks, AVerMedia has differentiated with a GPS device. So if you need to watch TV on a notebook, this device will ensure you don't get lost. $115 > AVerMedia > www.avermedia.com	**Winfast Palmtop DTV200H** One of those rare TV capture cards that works straight out of the box. A hybrid USB tuner that records digital and analogue TV and delivers excellent picture quality. $95 > Leadtek > www.leadtek.comau	**Hauppauge WinTV PVR-350** With a 125-channel capable receiver, this PCI card pauses and replays shows, is able to schedule recordings and burn them to CD or DVD. Great quality.  $429 > Hauppage > www.hauppage.com

	NOTEWORTHY	BEST VALUE	BEST PERFORMER
DISC PLAYERS	**Sony PlayStation 3 80GB** Yes, it's a games console, but it also doubles as a Blu-ray player that's as good as any standalone devices on the market. It's the same price as some of the better ones, so do your sums. **$699 > Sony > www.sony.com.au**	**Kogan Blu-ray Player** NEW Basic, affordable. Plays back good-quality HD and upscales DVDs. Downside is lack of support for BD-Live (Profile 2.0) which means no internet content or firmware upgrades. But at $249 who's complaining? **$249 > Kogan > www.kogan.com.au**	**Sony BDPS350** NEW Superb HD playback quality and does great upscaling of DVDs to high definition. Unlike last month's $1,799 Pioneer, available for around $400 on the street. **$400 > Sony > Sony.com.au**
PVR	**Dvico TVIX 3330 Jukebox** NEW Records SD & HD in 1080i with its in-built TV tuner, plays back video, JPEG slide shows and lets you transfer or stream via LAN. **$529 > Lako Vision > www.lakopacific.com**	**Wintal PVR2HD** If all you want is a PVR without an analogue tuner or smarts then this PVR is ideal — it's affordable, it does the job and comes with a big 320GB hard disk . **$499 > Wintal > www.wintal.com.au**	**Panasonic DMR-BW500** Can record two HD programs simultaneously to its 500GB hard disk or directly to Blu-ray media. Ethernet port. **$2,199 > Panasonic > Panasonic.com.au**
ROUTER	**D-Link DGL-4500** NEW A dual-band gigabit router built for gamers. Helps prioritise game traffic, and now with Green technology, which detects link status and cable length and adjusts power usage accordingly. **$350 > D-Link > www.dlink.com.au**	**TP-Link TL WR941ND Wireless N** A Draft 2.0 N router with MIMO, using three adjustable antennas for speeds of up to 200Mbit/s. Performance is decent and the documentation is good. **$129 > TP-Link > www.anyware.com.au**	**Linksys Dual-N WRT610N** NEW It does dual-band Wireless N (5GHz and 2.4GHz), is one of the best performers in testing and looks great. Comes with Linksys' superb LELA network setup wizard. **$290 > Linksys > linksys.com.au**
PRINTER OFFICE	**Fuji Xerox DocuPrint C2255** Strong, sturdy and packed with features that justify its price tag. Its print quality is above average and it's also relatively quiet. **$3,960 > Fuji Xerox > fujixeroxprinters.com.au**	**Samsung CLP-350N colour laser** An affordable colour laser with the specs to meet basic business requirements, with PostScript3 and PCL6 emulation support and network capability. **$399 > Samsung > www.samsung.com.au**	**Oki C5950dn** A serious colour LED printer for workgroup printing, with a 60,000 page a month duty cycle. Achieved excellent print quality in our testing. **$2,035 > Oki > www.oki.com.au**
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74 howto

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HOW TO CLEAN THE MUCK OUT OF YOUR PC!

A dirty machine can overheat and fail, so in order to avoid a PC disaster, it's time to do a little housekeeping. Prepare to get your hands a little dirty.

83

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WINDOWS

XP-STYLE FOLDER MENUS

Q I have recently upgraded to Windows Vista from XP Professional and, while I am fairly impressed with it, I do miss the old 'File, Edit, View' menu when browsing my hard disk.

Nicole Todd

A Well you're in luck, because in any Explorer window you can simply press Alt and the old menu will return. If you want it restored permanently, select 'Folder Options' from the Control Panel. In the View tab, click on 'Always show menus' and then click on 'OK' to finalise the change.

WINDOWS

DELETE LONG FILE NAMES

Q One of the things that drives me batty is a file that can't be deleted. Windows will give me an error along the lines of "Cannot delete this file, file name is not valid or too long. . ." Why does Windows allow these files to be created in the first place if they are not valid? How can I get rid of these files?

John Robson

A It's an idiosyncracy of Windows that it allows you to create file and folder names that its own Windows Explorer then cannot rename or delete. This also includes the creation of folder paths that exceed the maximum limit of 260 characters.

The hard way to fix it is to drop into DOS and delete everything in the folder containing the long file name, ie. del *.ext (ext for the file's extension). A much easier way is to use a utility called DelinvFile, from **http://purgeie.com/delinv**. It lets you locate the offending files or folders and easily delete them. It's shareware, but its fully working 15-day trial should give you enough time to clean up your PC.

WINDOWS

STAGGERED BOOTUP

Q What I don't understand is why OSs have to load absolutely everything at startup and then wait until every single last file is loaded before making the PC available to the user. I really think it's unacceptable that I have to wait several minutes for a PC to boot up. Why doesn't Windows de-prioritise some programs so that it only boots up with the essentials first?

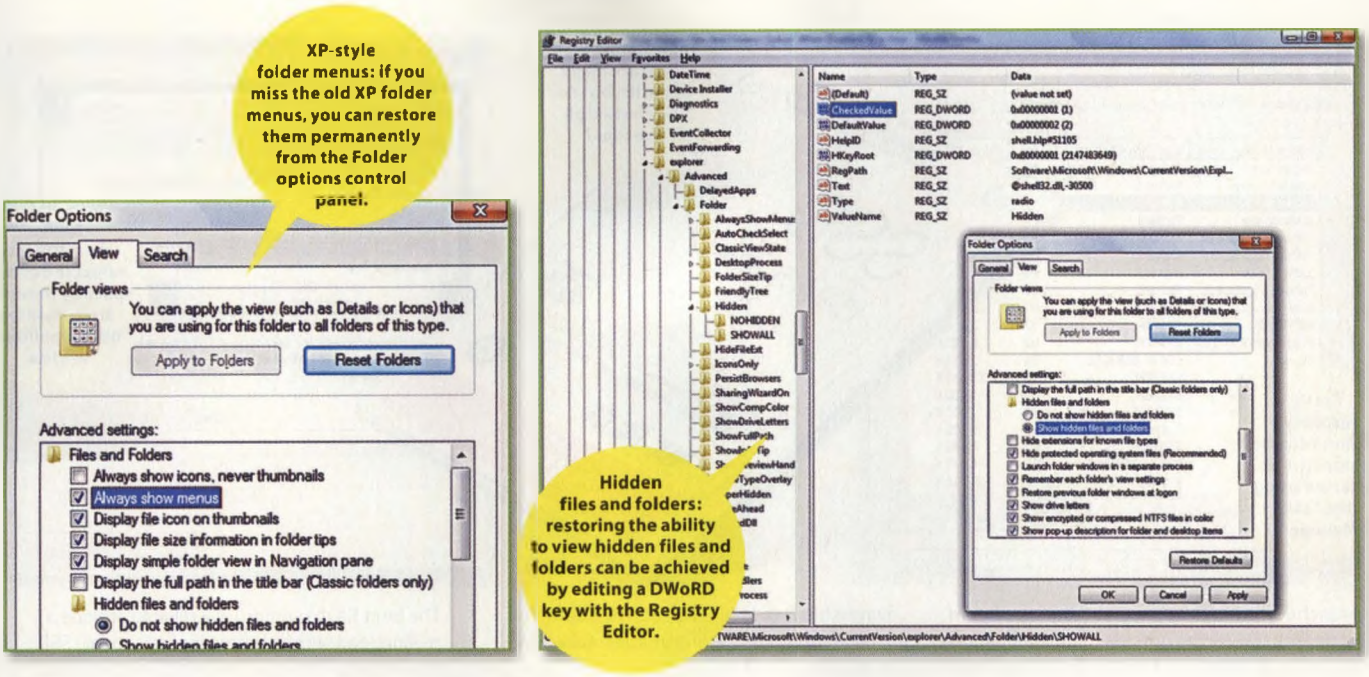
A An OS will load everything at the start to make sure it's all running properly before you get to work — but the problem is that it becomes a traffic jam as every program in the start list tries to grab CPU time and hard disk access, and the whole thing bogs down and takes forever. Third parties have already tried to address this issue. A free program called StartUp Delayer by R2 Studios lets you designate what programs can start later in the boot sequence and how many seconds after Windows has started. Startup programs that you may not use immediately in each session are ideal candidates.

WINDOWS

UBIQUITOUS PROCESS

Q What the hell is the svchost.exe process in Windows? When I check what's hogging my CPU, it's always up there near the top and sometimes there are several instances of it. Yes, I have Googled it, but since it's supposedly a "generic host process name for services that run from dynamic-link libraries" I am no clearer to understanding what it does.

A Windows runs a whole bunch of internal services in order to function from .dll files. These don't interact directly with the user. However, unlike .exe files, .dll files can't launch themselves, so they need an executable program called svchost.exe. It bunches them into groups, and each group is a svchost.exe.


XP-style folder menus: if you miss the old XP folder menus, you can restore them permanently from the Folder options control panel.
Folder Options
General
View
Search
Folder views
You can apply the view (such as Details or Icons) that you are using for this folder to all folders of this type.
Apply to Folders
Reset Folders
Advanced settings:
Files and Folders
Always show icons, never thumbnails
Always show menus
Display file icon on thumbnails
Display file size information in folder tips
Display simple folder view in Navigation pane
Display the full path in the title bar (Classic folders only)
Hidden files and folders
Do not show hidden files and folders
Hidden files and folders: restoring the ability to view hidden files and folders can be achieved by editing a DWoRD key with the Registry Editor.
Registry Editor

WINDOWS

MAPPED DRIVES IN VISTA

If a user logs onto Vista using the root (hidden by default) administrator account and creates a persistent drive map to a share via UNC name, the share will not be available to users running in elevated mode. This is because the share is only mapped for the current session and only to the currently logged-on user. Even if the share is persistently mapped, users running in elevated mode will not be granted permission because the logged-on user has a different token to everybody else.

This behaviour is intended to prevent malware from creating hidden network drives that can persist across log-in sessions and enable viruses to propagate.

If you don't benefit from this behaviour, it can be changed by altering the value of the following Registry entry: HKEY_LOCAL_MACHINE\SOFTWARE > Microsoft > Windows > CurrentVersion > Policies > System > Enable LinkedConnections.

If the DWORD key (the 'Enable LinkedConnections' part) does not exist, create it. If the value is 0, change the value to 1.

WINDOWS

HIDDEN FILES AND FOLDERS

Q I've noticed that my 'Show hidden files and folders' option is not working. Even if I select the option from the Folder Options window, the changes disappear upon closing the dialog box.

George Turnbull

A You should be able to restore this option by selecting 'Start > Run', typing in 'regedit' and pressing Enter. Once the Registry Editor has loaded, you need to drill all the way down to HKEY_LOCAL_MACHINE > SOFTWARE > Microsoft > Windows > CurrentVersion > Explorer > Advanced > Folder > Hidden > SHOWALL.

When you arrive there, take a look at the 'CheckedValue' key. This should be a DWORD key.

If it is, make sure that its value is set to 1. If it's not a DWORD, delete the key and create a new one called 'CheckedValue' as a DWORD. Give it a value of 1.

Now open the Folder Options control panel and click on the View tab. The 'Show hidden files and folders' checkbox should now work normally.

WINDOWS

USE EXPLORER TO REGAIN CONTROL OF A FROZEN PC

The 'Explorer process' is the shell in which applications run. Recent versions of Explorer have additional functionality, such as the ability to view picture thumbnails and so on without

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launching an application. If a running program attempts to execute outside of its application space, Explorer should be able to manage this without affecting other running programs. You can see if this is happening when the mouse pointer changes to a 'busy' pointer when the mouse is moved over the application that is not responding. However, if a poorly written program hangs the Explorer process, the computer will fail to respond. In this case, the only way to manage the computer is from the Task Manager.

Start the Task Manager and look for the Explorer process in the list of processes. Click on 'Explorer' and then click over 'End Process' at the bottom of the dialog box. Applications, icons and so on will disappear behind the Task Manager as Explorer stops. Choose 'File' then 'Run' and run 'explorer.exe'. Explorer will now start and reveal the normal desktop, icons and running programs. In this way, you can regain control of a frozen PC without having a machine restart and with a possible loss of data.

WINDOWS

RECOVER LOCKED FOLDERS

If you have ever recovered a hard disk, you may have come across the problem of folders that require higher administrative permissions than those associated with your account, even though you are the root administrator.

The problem in this case is that the folder was owned by an administrator with a different SID (Security ID) token than the token used by the current administrator. This is a tricky problem because the folder is locked out until the 'lost and hidden' key is used again. Double-clicking on any item within the folder will produce the error: "You do not have permission for this file", and you may find that you're not even able to view the contents of the folder, depending on how ownership was originally set. The solution is to use two command line utilities: takeown and icacls.

Start a command prompt in elevated mode and navigate to the locked folder. Within the locked folder, use these commands:

```
c:\lockedfolder\takeown /f *.* /r /d y c:\
lockedfolder\icacls /grant:r /t
```

HARDWARE

SOLID STATE DISK DRIVES

Q I am considering purchasing a 32GB SSD hard disk to replace the one currently in my laptop to increase its battery life. Do you think this is a good idea?

Declan Ellis

A The answer's not quite as simple as we'd like it to be: it may be a good idea. Most solid state disk drives (SSDs) use flash memory, giving them several advantages over standard hard drives. For example, the average SSD consumes less than a watt during read and write operations, while a magnetic drive is likely to use anything up to 10W.

SSDs have no moving parts, which means increased reliability over standard hard drives, and startup should be up to 30 times faster because magnetic drives have to spin up to speed. What's more, SSDs have very fast read and seek times due to not having to physically move a magnet over a spinning disk.

There are downsides, too. SSDs have a much shorter lifespan than a regular hard disk. A magnetic hard disk will generally last at least three to five years (often a lot longer if well treated). However, an SSD's life depends on various things, including what quality of flash memory it uses. Cheaper flash memory used in the cheapest SSDs will only provide about 300,000 reads and writes before it starts failing. The best flash memory will reliably provide a million read/writes before it starts to fail. SSD makers also use special algorithms to spread the wear across the memory blocks, but all the evidence so far is that you'll be lucky to achieve even half the lifespan of a standard disk-based drive even with the highest-quality SSD drives available today.

So the answer has to be based on whether the extra longevity of your battery will be worth the cost of buying your SSD, and possibly also replacing it if the applications you use happen to thrash it. However, prices of SSDs are also going to keep coming down, so replacing an SSD drive earlier than a disk-based drive may not hurt the wallet badly.

WINDOWS

SHADOW COPYING

Windows Vista Ultimate and Windows Vista Business are complemented with the inclusion of the Shadow Volume Copying service. This feature was previously only available if your computer was a member of an Active Directory forest. Now, almost any Vista user can benefit from the ability to find and retrieve previous versions of documents saved.

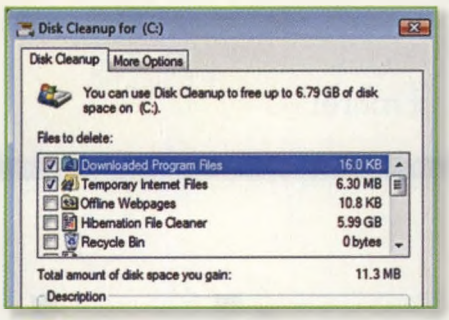
In this scenario, a user who had overwritten crucial changes to a valuable document and then saved that document can open a previous copy of the Documents folder and find the document as it was beforehand. Volume Shadow Copying is enabled by default.

To retrieve a document, right-click over the Document folder and choose 'Restore Previous Versions' from the menu. Properties for the Document folder will appear with 'Previous Versions' in focus. You'll see a list of snapshots available. Click on the most recent and choose 'Open'. The snapshot will open in a new window.

From here the document can be opened and

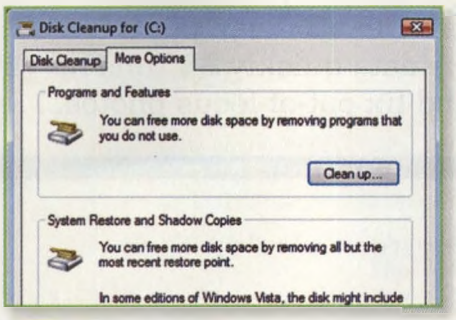
3 STEPS HELP DECREASE HARD DISK ACCESS TIMES

Clearing the rubbish from your drives can have a supercharging effect on your PC.


Disk Cleanup for (C:)
Disk Cleanup
More Options
You can use Disk Cleanup to free up to 6.79 GB of disk space on (C:).
Files to delete:
Downloaded Program Files 16.0 KB
Temporary Internet Files 6.30 MB
Offline Webpages 10.8 KB
Hibernation File Cleaner 5.99 GB
Recycle Bin 0 bytes
Total amount of disk space you gain: 11.3 MB
Description

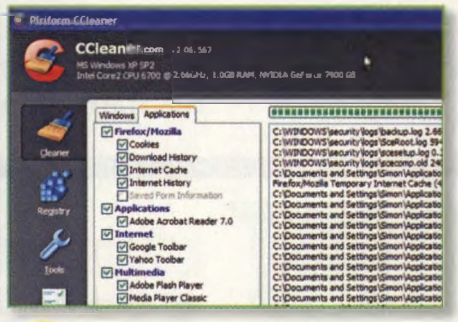
1 USE A DISC CLEANUP WIZARD

The Disk Cleanup wizard can be used to remove all sorts of temporary files, error reports and other files that you no longer need. It couldn't be more easy to use: simply tick the items that you want to clean and let the wizard work its magic.


Disk Cleanup for (C:)
Disk Cleanup
More Options
Programs and Features
You can free more disk space by removing programs that you do not use.
Clean up...
System Restore and Shadow Copies
You can free more disk space by removing all but the most recent restore point.
In some editions of Windows Vista, the disk might include

2 SYSTEM RESTORE POINTS

You can also use Disk Cleanup to remove all but the last System Restore point. Deleting the System Restore points can free up a large amount of space. Programs you never use can also be removed.



3 TRY CCLEANER

CCleaner does a wonderful job of not only removing files that the Disk Cleanup wizard may have missed but it will also uninstall software for you. You can use CCleaner to remove invalid entries from the Registry, too.

saved under a new name in the 'real' Documents folder. If you want to expand the functionality of the Volume Shadow Copying service — by adding drives or folders, for example — choose 'System Protection' from the System Maintenance section of the Control Panel.

LINUX

KEEP YOUR SYSTEM RUNNING QUICKLY AND SMOOTHLY

On any desktop-oriented Linux distribution, a large number of background tasks are always running. Ubuntu Linux, for example, can have upward of 60 processes in varying states (running, sleeping, waiting for results from another process), even when you're at the desktop and not doing anything. To see the currently running processes on your machine, open a terminal window and enter 'ps ax'. The 'ps' bit lists processes, while the 'ax' parameter tells it to list all processes on the system, not just those started by the current user. You may want to feed the output to a text file, for example: 'ps ax > processes.txt'.

Now that you can see the list of processes that are taking up the power of your precious CPU, you'll be able to choose to close down applications as you see fit.

This is especially useful if you have a lot of processes running. Many of the processes beginning with 'k' are kernel tasks: they're crucial to system operation. You'll see others relating to your log-in manager (for example, 'gdm' or 'kdm'), the X Window System ('X') and desktop programs.

To find out which processes are hogging the most CPU and/or memory, enter 'top'. This will display a detailed list of processes and statistics in a chart-like form. The most important columns are PID (the process ID), RES (the amount of memory used), %CPU (how much CPU time the process is taking) and COMMAND (the name of the process).

For instance, say that Firefox has completely locked up and you can't close it. Enter 'top' and you may see that it's eating up most or all of your CPU time. Next, find the application's PID. Take note of the PID, exit top and enter 'kill', followed by the PID number. This command will try to terminate the program normally. If that method fails, try entering 'kill -9' followed by the PID number.

This is a brute-force method that can terminate nigh-on any process.

INTERNET

MAKE IMAGES FROM WEB PAGES

Saving complete web pages is a tricky job: you have to make sure that you're acquiring all the images, JavaScript files, CSS files and so on rolled into one place, and that doesn't deal with chunks of a page that may be generated by an external source. But there's an easy way to make a pixel-perfect copy of a page: the Screengrab extension for Firefox (**www.tinyurl.com/2hh6m4**) adds a right-click menu entry to the web browser, letting you save the current view of the page or the entire page as an image.

INTERNET

TORRENT PREVIEWS

Q Is there any way of previewing Torrent files before downloading? I'm losing track of the number of times I've downloaded files only to find they're rubbish.

A You're in luck, but only just. It's difficult to preview Torrents because the Torrent protocol will download a file to your PC in ad hoc order, with parts out of sync until they all arrive onto your PC and are pulled together in a coherent whole. However, there is a new Torrent search engine called VerTor (**vertor.com**), which analyses thousands of clips on all the major Torrent hosts and provides preview clips or screen grabs of each.

LINUX

SPEED UP YOUR LINUX DESKTOP

Most Linux distros use Gnome or KDE as the default desktop. They're very powerful but use a lot of RAM and can be sluggish on older machines. Xfce is a lighter desktop, built on the GTK toolkit that still includes the features you'd expect: program menus, panels, virtual desktops, a file manager, utilities and more. Xfce may be available in your distro's package repositories, but if you want to use a completely Xfce-based distro with a selection of lightweight apps, try Xubuntu, a remastered version of Ubuntu (**www.xubuntu.com**). APC

82 insider tips

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85 Sharpen and fix out-of-focus photos. . . and more!

WINDOWS VIEW

Vista on your netbook

Although netbooks aren't built with Vista in mind, with some judicious tweaking they can run it very well.

APC EXPERT

JAMES BANNAN

James Bannan is a systems manager at St Leonard's College (Vic) and *APC*'s resident Windows expert.

Pretty much all netbooks are built around some form of Linux or Windows XP. The rationale is that low-power PCs run best with an undemanding OS, and while Vista is far more resource-hungry by default, there are ways to streamline it and turn it into a flexible and powerful netbook platform.

The first step is to install Vista. As netbooks don't have optical drives, you can either connect an existing optical drive to a USB interface and install Vista from that, or use a USB thumb drive to make a bootable Vista installation device.

To do this you'll need a 4GB USB drive with decent read/write speeds. It is possible to use a 2GB device but you'll need to customise the installation packages, which we won't cover here. You'll also need an existing XP- or Vista-based system to prepare the drive and the Vista install DVD.

Connect the drive to the preparation system and make sure that the system can see it. Then open a command prompt and type in 'DISKPART': this is the Windows disk management utility. Then type in the following commands in order:

- LIST DISK (this gives you a list of available physical disks)
- SELECT DISK 1 (assuming the USB device is DISK 1)
- CLEAN
- CREATE PARTITION PRIMARY
- SELECT PARTITION 1
- ACTIVE
- FORMAT FS=FAT32
- ASSIGN
- EXIT

This creates a FAT32 partition on the USB drive and assigns a drive letter. Now make sure the Vista install DVD is in the optical drive and type in: 'xcopy d:*.* /s/e/f e:\' (this assumes the optical drive is d:\ and the USB drive is e:\).

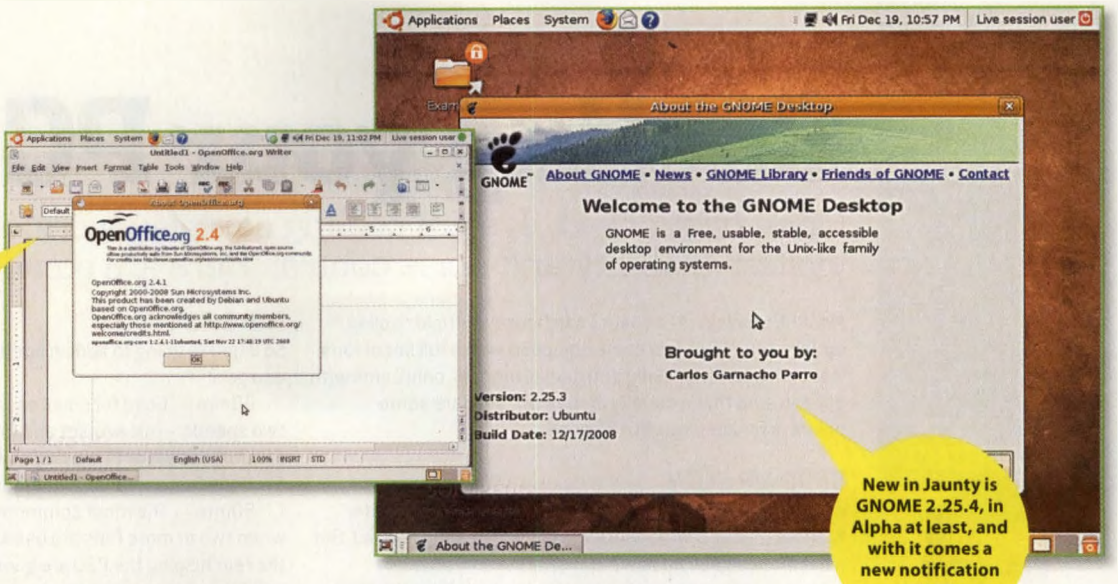
Rumours of Vista's non-suitability for netbooks have been greatly exaggerated...

The USB drive is now ready for work. Attach it to the netbook and power the system on. When the BIOS screen launches, press the button to launch the boot menu and choose the USB drive. If there is no button, go into the BIOS and either enable the option (usually in boot options) or configure the boot order so that the USB is first. Boot from the drive and install Vista.

Once Vista is installed there's a few things you need to do to get it running smoothly:

- Drivers: netbooks use fairly standard hardware. Get the latest graphics drivers from Intel and audio drivers (probably from Realtek) and Vista will handle the rest. Do an online check with Windows Update for any other devices like network adaptors. If there's anything which Vista can't find (like card readers) then the vendor-supplied Windows XP drivers should work fine.
- Turn off Vista Aero: although it looks pretty, by using Windows Classic you can save around 60MB of RAM and claw back some screen real estate, which is important at netbook screen resolutions.
- Install the latest DirectX: this will help with faster graphics rendering.
- Turn off System Restore: you'll lose the protection it offers but you won't have to deal with the system lag or hard drive thrashing it can cause. This is particularly important for netbooks with solid-state drives.
- Change indexing options: Vista keeps an up-to-date file index of offline files, the Start Menu and the Users folder. Removing some of these options (Control Panel, Indexing Options, Modify) will slow down file searches but will improve drive performance.
- Use a non CPU-intensive antivirus like AVG Free.
- Try a low footprint browser like Google Chrome; not everyone likes it but it will save you a few MB.

Follow these tips and Vista makes a great netbook OS: fast and powerful (and they work for Windows 7 too!). APC


Applications Places System
Fri Dec 19, 10:57 PM
Live session user
About the GNOME Desktop
GNOME
About GNOME • News • GNOME Library • Friends of GNOME • Contact
Welcome to the GNOME Desktop
GNOME is a Free, usable, stable, accessible desktop environment for the Unix-like family of operating systems.
Brought to you by:
Carlos Garnacho Parro
Version: 2.25.3
Distributor: Ubuntu
Build Date: 12/17/2008
About the GNOME De...
OpenOffice.org 2.4

Jaunty Jackalope will update a number of major apps, including OpenOffice and Firefox.

New in Jaunty is GNOME 2.25.4, in Alpha at least, and with it comes a new notification system.

LINUX WINDOW

Jaunty Juvenile

One advantage of the six-month release cycle is that you know there's always something cooking to be played with. . .

The next release of Ubuntu, 9.04, aka. Jaunty Jackalope, recently hit Alpha 3, and so I sat down to see what we can expect to find come the end of April.

And, as usual, there are a host of updates, and a few surprises, too.

First up, the big name applications: OpenOffice 3.0 didn't make it for 8.10, and Jaunty wisely bundles this latest release of the office suite. As the *feature freeze* for Jaunty is at the end of February, it's likely the current version of OpenOffice (3.0.1) will be used, even if there are updates later in the quarter.

Firefox, too, gets an update to 3.0.5, and unless 3.1 comes out by the end of February (it's scheduled for Beta early February) will also be the de facto for Jaunty.

The kernel, of course, is updated (the recently released 2.6.28 in the Alpha) and here is where some of the significant changes come. The new version brings with it a host of driver updates and, importantly, the inclusion of the Ext4 filesystem as mainline. This is a significant milestone, as it will invariably replace Ext3 as the default filesystem of choice, not just for Ubuntu but all Linux distributions. For Jaunty, at least, the installer will offer the option of using Ext4 on a new install, but will still default to Ext3.

Ext4 is important, as it brings with it a number of new features, including: extents, which can help minimise fragmentation; delayed allocation, which can improve performance and can also reduce fragmentation; persistent pre-allocation, which provides for faster contiguous allocation; journal checksumming, to ensure better reliability of the journal and improve performance; as well as faster filesystem checking, nanosecond scale timestamps and filesystem volumes up to one exabyte in size. It is, all up, an important update.

Perhaps, partly due to Ext4 and partly due to a new kernel 2.6.28 feature called *asynchronous startup*, early reports of Jaunty's boot speed are considerably faster, at around a 30% speedup over 8.10, and that's just for slower lower-end systems too. We'll hold off for the final release for benchmarking any improvements, but it's a promising start.

Also new with Jaunty is GNOME 2.25.4, in the Alpha at least, and with it comes a new notification system: you're already used to pop-up bubbles that let you know what's going on, but now they have a little count-down timer in the form of a diminishing clock face, as well as a button you can click so as not to be bothered by that type of notification again. It's a small touch, but a nice one, and edges Ubuntu further into ease-of-use territory.

The volume control, small though it may sound (pun intended!), has had a complete overhaul; it's a proper applet to manage your audio output and input now. Broken down into tabs that include overall system volume and sound theme, input controls replete with an input level meter, support for multiple output devices and the ability to set output volume on an application by application basis, like the much-touted feature of the same in Vista.

All up this quick glance at the next Ubuntu release is promising. As always, there appears to be a lot of under-the-hood polish going on even while new features and functionality are added. We're definitely looking forward to see if the problematic Pulseaudio back end will be further improved, but the feature freeze is a month away at the time of writing, so there could be more surprises in store. The final release is due April 23, and if the super-fast boot times are anything to go by, will likely be a jaunty one indeed.

APC EXPERT

ASHTON MILLS

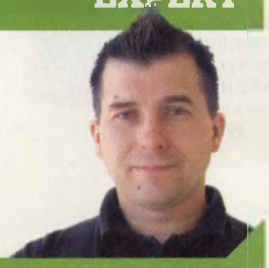
Editor of the Linux Pocketbooks series, and now with CHOICE magazine, Ashton has been a tech journo for over 13 years, including five years with APC.

HARDWARE

Cooling your PC

Often overlooked, system cooling can play a critical role in system stability and noise control. Here are some tips on cooling.

APC EXPERT



DORIAN BUSSENIUS

Dorian Bussenius has 15 years experience in PC hardware and assembly. He is an expert in SOHO and gaming system design and performance with Gamedude computers in Brisbane.

www.gamedude.com.au

Most PC chassis (ATX cases) can house multiple cooling options but only a few come equipped with a full set of fans. Most chassis, especially entry-level models, only come with one fan, and that's usually in the PSU. Here are some pointers for keeping your PC cool.

GOOD AIR FLOW

Air flow is the most important part of cooling a computer. Without it your components will quickly heat up and fail. But what makes good airflow?

In general, cooling aims to suck fresh air from the front and blow it out the back. Hot air rises, so this is why PSUs tend to be near the top of the case, blowing air from in the PC out the back. But is that enough? No. In most cases, your PSU fan will struggle moving the volumes of air inside your PC and will need help from additional fans pulling fresh air in from key locations. It is also worth noting that airflow only works if the case is sealed... cases with no panels and cases with grille/mesh-style designs will not benefit as much and will require larger amounts of force to place cool air where it is needed.

The best air flow system sucks air from the front/side and blows it from the back/top.

FAN SIZES

So if you're going to add an additional fan, what size do you get?

60mm — Good for small cases only. Often come in two speeds — slow/quiet and fast/loud — and is not recommended for PCs using high-end components. Even the fastest fans do not move enough air volume.

80mm — The most common size and very effective when two or more fans are used. One at the front and one at the rear helping the PSU are good. If your chassis has the room, more is better.

90mm — Not a common size and very little difference to 80mm, although it tends to be a little more quiet.

120mm — This is the biggest and the best fan size, slow spinning and quiet. The larger blade surface area means you still move more air than most 80mm fans. Recommended if you can fit one in.

FAN NOISE

With careful planning you can reduce the noise of your PC and still maximise the cooling performance. Fans are designed with different blade pitches and speeds, but in general, the faster they spin the louder they are.

Consider getting fan controllers, as these can control the speed of your fan, from nearly stopped to full speed, allowing you to get the best cooling/noise ratio for your chassis.

Fan mounting can sometimes cause noise if there are too many restrictions to the airflow on the case, so you may want to try cutting out a hole in the chassis and using a dedicated fan grille.

BEARINGS

There are big differences in the bearings used in fans. From worst to best are Sleeve, Rifle, Ball and Fluid bearings. Sleeve bearings are cheap but have a shorter life span, Rifle are quieter and last longer, Ball are more durable and better sealed and Fluid bearings are silent but expensive so you probably won't want to go this way unless you value silence.

There's no one perfect combination of the above — it depends on your chassis and how much you want to spend, but if I were to recommend anything it would be that you install some extra cooling and save yourself the headache of failed components later on. APC

The most effective air flow for a cool system is in at the front, out at the back, and the bigger the fans the better!
POWER SUPPLY EXHAUST FAN
EXHAUST FAN
INTAKE FAN

MAINTENANCE

Clean out the muck

A dirty machine can overheat and fail, so prepare to get your hands a little dirty.

Even if you regularly clean your keyboard and mouse, your actual computer is often neglected. Because your PC is in a case, you can't see what's going on inside, and most people forget that the fans they contain are designed to suck air inside to cool the interior. A well-designed case will suck air in from the front so that it passes over as many components as possible before exiting at the rear.

DUST TO DUST

Over its lifetime, a PC will pull a huge amount of air into its interior — and with it will come all sorts of airborne foreign matter. The position of your case is important, as PCs that live on a desk won't be as badly affected as one that resides on the floor. Although many more expensive cases now come with dust filters in front of the fans, most OEM cases do not, so there's nothing to stop dust spreading through the guts of your PC. A build up of debris can be a real problem, potentially blocking the air intakes, restricting airflow and hence causing your PC to overheat.

In cases that don't have filters, the dust invariably ends up on the fan blades and inside the vanes on your CPU's heatsink. Although it might not seem like a bit of dust on the fans is going to cause much of a problem, it can unbalance the fan and add extra weight to the fan blades. Both of these effects can cause the fan to become noisier, fail prematurely and, in some cases, cause your computer to use more power. In addition, if the vanes on your CPU's heatsink become blocked then your CPU can start to heat up too much.

Dust also acts as an insulator, so a thick covering on your hard drives and expansion cards will mean that they will become hotter. Hard drives generate a fair amount of heat, so should really be kept as cool as possible, while expansion cards form the basis of thermal creep — where the heating and cooling cycle make the card expand and contract, moving it in its slot. Although the movement is small, one consequence can be that the contacts oxidise, which can potentially disable the card.

CLEANING UP

Every couple of months, it's a good idea to give your PC's internals a good clean, particularly if your computer sits in a dusty environment. A can of compressed air will quickly clean the fluff inside heatsink vanes, off fan blades and out of all the nooks and crannies in your PC's case. Remove expansion cards and gently clean the contacts with a pencil eraser to remove any oxidation. Hard drives can be cleaned with a soft paintbrush while dust filters can sometimes be washed in warm soapy water. Don't be tempted to stick a Hoover nozzle in your case though, as vacuum cleaners generate static and a lot of suction, which can cause damage to your PC's delicate internal components.

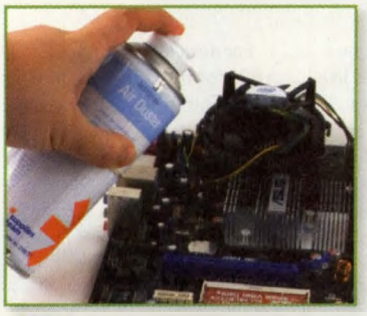
APC EXPERT

ROBIN NIXON

Robin has worked with PCs since the mid '70s. He fondly remembers his first computer: a Tandy TRS-80 with 4KB of RAM.

3 STEPS HOW TO KEEP YOUR PC CLEAN

Useful techniques to fight the buildup of grime and clutter.



1 BLOW AWAY GRIME

Use a can of compressed air to blast dust out of your heatsink and off fan blades. Ensuring these areas of your computer are free of dirt and debris will ensure a good flow of air inside your PC, helping to keep it cool and use less power.

2 SWEEP OUT GRIT

You can use a soft paintbrush to remove dust from your hard drives and other delicate components. You should be careful not to use water or other liquids unless they are specifically recommended for use inside your computer.

3 CLEAN SLOT SMUT

As expansion cards heat up and cool down they can move in their slots, which may cause problems with the connections. Remove the cards and gently clean the edge contacts with an eraser to improve the electrical connectivity.

APC EXPERT

PETER JOHNSON

In his job, Peter is required to securely wipe hard disks when the company disposes of older PCs.

DISC WIPING

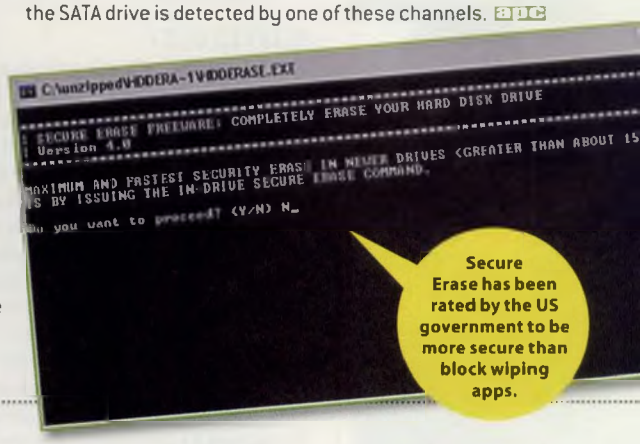
Truly delete data quickly

There is a way of wiping data on large drives quickly and effectively — but it's best tried by advanced users.

We all know that deleting files with the delete command doesn't delete them, it only makes them unreadable by the OS and recoverable by data recovery software. However, popular block erasing utilities such as Darik's Boot And Nuke are too slow to be practical on many of today's 500GB+ drives. They overwrite the data several times and can take days to wipe a large drive. They are also likely to fail to wipe data blocks reassigned by drives, multiple drive partitions, host protected areas, device configuration overlays or even drive faults.

There is a better, little discussed alternative: the Secure Erase command built into the firmware of most modern hard drives. Implemented in all ATA interface drives manufactured after 2001 with capacities greater than 15GB, it's executed by a freeware DOS utility called HDerase.exe and effectively wipes a disc by overwriting all data, including g-list records that could contain readable data in reallocated disk sectors (which are sectors that the drive no longer uses because they have hard errors). Secure Erase has been rated by US government agencies to be more secure than block wiping utilities.

Download HDErase.exe from **tinyurl.com/2xoqqw** and copy it to a DOS boot disk (floppy, CD, or USB). Reboot the computer (with the right priority boot order in the BIOS) and type 'hderase' at the DOS prompt. We recommend it for techies only because it only recognises SATA drives on the primary and secondary IDE channels (ports 01F0-01F7 and 0170-0177), and if not, you must configure the BIOS so that the SATA drive is detected by one of these channels. APC


C:\unzipped\HDDERA-1\HDDERASE.EXT
COMPLETELY ERASE YOUR HARD DISK DRIVE
Version 4.0
MAXIMUM AND FASTEST SECURITY ERASE IN NEWER DRIVES (GREATER THAN ABOUT 15
IS BY ISSUING THE IN-DRIVE SECURE ERASE COMMAND.
you want to proceed? (Y/N) N_
Secure Erase has been rated by the US government to be more secure than block wiping apps.

APC EXPERT

PETER DOCKRILL

Peter Dockrill is *APC*'s DVD Editor. He also edits the Chip Chat column, in addition to writing occasional reviews and sub-editing the magazine. He formerly edited *APC*'s Watchdog section.

SYSTEM OPTIMISATION

Tune up your PC

Our cover disc software helps you optimise your PC's performance the easy way. **Peter Dockrill** explains how.

There's nothing like the enjoyment and performance you get out of a new (or freshly set up) PC. Everything goes like clockwork. And why wouldn't it? After all, it hasn't had a chance to get slowed down yet by all the things you'll end up doing to it! Yet, by the time a PC has gotten several months (and installed applications) under its belt, you could be seeing a significant downturn in its operation, efficiency and speed. But it doesn't have to be that way.

For a wide-ranging system optimisation suite, you really owe it to yourself (and your poor, maligned PC) to check out our free full version software on the cover disc this month: TuneUp Utilities 2008. TuneUp Utilities is an all-in-one (and simple-to-use) GUI system optimiser, featuring six modules, each of which includes a number of tools to help you fix, optimise or clean up your PC. The six modules are: Increase Performance; Free Up Disk Space; Maintain Windows; Solve Problems; Customise Windows; and Additional Tools. Just pick the module from the menu on the left, then select the relevant tools you want to use on the right.

For detailed assistance, we've included the full manual in PDF form on the disc, and for an even more sophisticated set of tools, there's also a trial version of the new TuneUp Utilities 2009, so check that one out too (and put the zippiness back into your machine pronto). APC

PHOTOGRAPHY

Sharpen and fix out-of-focus photos

Blurry photos are a common blunder, but there are some simple approaches to help sharpen them up.

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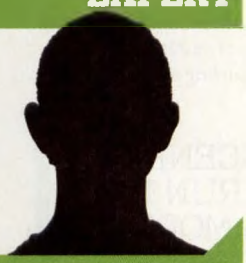


CHRIS JIANG

Maybe it was him, or his camera, or both, but Chris got sick of finding out-of-focus photos of friends and kids and decided to approach the problem a little bit more scientifically.

Let's get this out of the way first. If a photo is badly out of focus, there is no miracle cure, except for blowing it up to 500 per cent to hand-sharpen edges and paint out the picture noise. NASA is supposed to have supercomputing technology which will sharpen photos way beyond what's possible at consumer level, but then, when a two billion dollar space probe sends you a photo that's out of focus, you'll spend whatever it takes to fix it.

At a consumer level, you can start with a cheaper super computer: your brain. All you do here is sample the colours surrounding the fuzzy edge and extend them out to create a sharper edge, then resample, paint. Over several days, you can get an acceptable result.

A more realistic way of fixing an out-of-focus photo is to use filters that come with Photoshop or The Gimp.

In both cases, view the image at 100% size. In Photoshop, go to Filter > Sharpen > Unsharp Mask. In The Gimp, Filters > Enhance > Unsharp Mask. The settings that you play with to sharpen your image are the same in both:

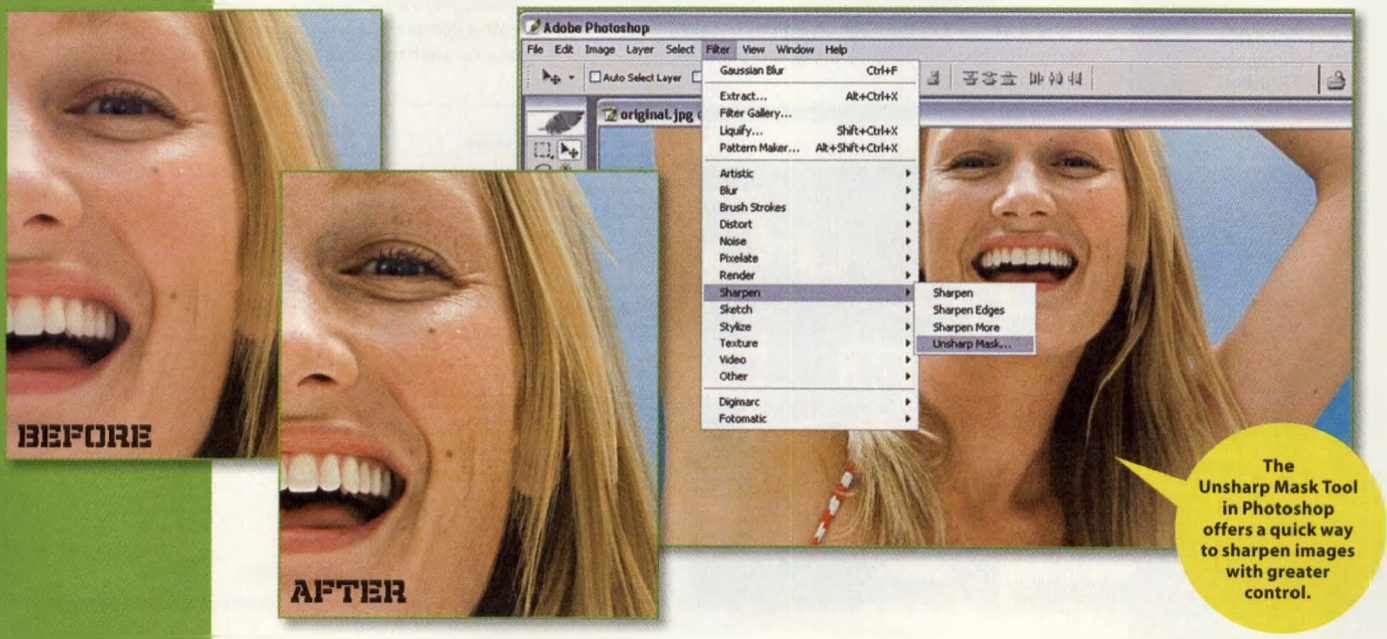
- Amount: how much contrast the edge is given, which determines the strength of the sharpening.
- Radius: controls the width of the sharpening halo.
- Threshold: reduces the image noise created by the above two.

Before you go mad balancing the settings, just play with the Amount first, moving the slider until you get a sharpening that you like, keeping Radius to 1 and a Threshold to 0. Then move Threshold to get rid of noise. The settings effectiveness will depend on the source image, so be prepared to keep playing, but be warned, you won't get a focused photo. Just one that's better than the original.

However, there is another way of sharpening photos in Photoshop which I have found to be very good. This uses the entirely different High Pass filter.

Open the image to be sharpened and duplicate the layer so that you can work on the copy. Go to Filters > Other > High Pass. The image goes grey, but that's OK. Set the Radius to four pixels and press OK. Right-click on the layer copy and select 'Blending Options', choose 'Overlay for Blending Mode' and click OK. The result will surprise you. The image will be sharper and, in many cases, better than what the Sharpen filter can produce.

There are also third-party sharpening filters you can test. One that's very popular is Focus Magic. It's a commercial product, but it lets you sharpen the first ten photos for free, and works both as a Photoshop filter and as its own program (there are Windows and Mac versions). Download it from **http://focusmagic.com**, install it and, if using Photoshop, find it at the bottom of the Filters menu window. APC



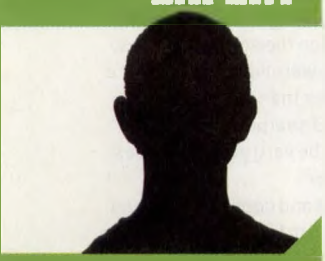
The Unsharp Mask Tool in Photoshop offers a quick way to sharpen images with greater control.

BROWSERS

Top Chrome hacks

Far from dying a quick death, Google's new Chrome browser is fast becoming the geeks' choice, as users begin to tinker with it.

APC EXPERT



JON THOMPSON

After some initial scepticism, Jon Thompson is now warming to Chrome in a big way.

While other browsers need a plug-in to download YouTube videos, Chrome can do the same with a small piece of JavaScript. Simply right-click on the bookmarks bar and select 'Add page...'. Call it 'Download Video' and enter the following JavaScript on one line in the URL box: "javascript: window.location.href ='http://youtube.com/get_video?video_id=' + swfArgs['video_id'] + "&l=" + swfArgs['l'] + "&sk=" +swfArgs['sk'] + '&fmt_map' +swfArgs['fmt_map'] + '&t=' +swfArgs['t'];".

Now, go to a YouTube page and set a video running. Then, click on 'Download Video' to download it. The progress is displayed in a bar at the bottom of the browser window, but if you press Ctrl+J you'll open a tab containing the download history.

One word of warning, though. The downloaded files are stored with the file name 'get_video' with no extension. Rename each with a sensible name, and give it the extension '.flv'. If you don't have any software that is able to play '.flv' files, you can download the free VLC Media Player.

COMPARE BROWSER RESOURCE USE

If you're not sure which of your browsers is using the most resources, there's a very simple way to see this information in Chrome, regardless of which browser you want to examine.

Simply hold down Shift and press Escape. This starts Chrome's internal task manager. If you now click on the 'Stats for nerds' button, a new tab opens and displays memory usage information for all running browsers, regardless of type.

The lower part of the page also gives detailed information about individual Chrome processes. You can lose the task manager for a better view.

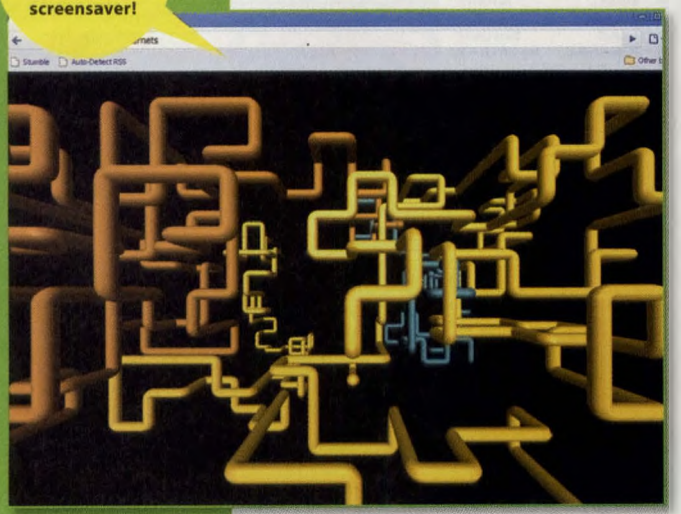
CHANGE CHROME'S PROCESS MODEL

Let's face it; Chrome's internal multiprocess architecture makes it very heavy on virtual memory. It's designed to be robust enough to run the next generation of Web 2.0 applications, and that means acting a little like an operating system. By default, Chrome consists of multiple processes, but if you're only using it for routine surfing duties, there's little point wasting all that extra memory and CPU time, even if you've got a fairly up-to-date PC that can handle the extra load.

> BEHIND THE SCENES, CHROME CAN RUN IN 3 PROCESSING MODES

Behind the scenes, Chrome can run in three processing modes. The most efficient of these is single process mode. To use this mode, open Chrome's properties in the Start menu and add the string '-single-process' (without the quotes) to the end of the Target box. Now, no matter how many tabs you open, the browser will use just one process.

If you add the string '-processper-site' to the Target line, Chrome will open a new process for each tab, but if you open the same site in two tabs, it will run them on the same process. The string '-process-per-tab' will force Chrome to create a completely new process and use a new memory space for each tab, which is its default.



A surprising find: Chrome running the XP 'pipes' screensaver!

With Chrome you can download and save YouTube videos on your PC for future viewing.

WINDOWS HOME SERVER

Installing and hosting a wiki

Nick Race shows how to install and run a wiki on Windows Home Server.

APC EXPERT

NICK RACE

Nick Race is *APC*'s Technical Editor. Nick has been with *APC* Magazine since 2004. He's an avid enthusiast of Windows Home Server and the functionality it can bring to a home network with a minimum of effort.

If you've been following the past number of Windows Home Server tutorials, you should now have a comfortably working web server using WHS' built-in Internet Information Server. The beauty of this setup is that IIS is a common and well-supported web server with any number of compatible web apps available free for download.

Rather than the more common Perl and PHP implementations of Apache web servers, IIS uses ASP.NET, so make sure any web application is compatible. In this tutorial, we'll show you how to install an ASP.NET wiki engine, Screwturn Wiki 2.0. Screwturn is available from **www.screwturn.eu** and is a free and open source wiki engine that works beautifully with WHS's IIS version.

The first step is to download Screwturn. For our WHS, we'll need the WebSetup Package, available from the Downloads page at **www.screwturn.eh/Download.ashx**. Save the file to your desktop PC, then load up a Microsoft Terminal Services Client (Start > Run > mstsc.exe). Enter the WHS's network name and click 'Connect'. Log in with username of Administrator, and the password is your WHS main password used to log in to the WHS connector software. This will present you with the WHS desktop session with full admin rights.

From your desktop PC, unzip the Screwturn Wiki zip file and copy the directory over the network to a share on your server where you have read and write access. Select your MSTSC connection and, through the Shared Folders shortcut on the WHS desktop, navigate to the share where you put the Screwturn directory.

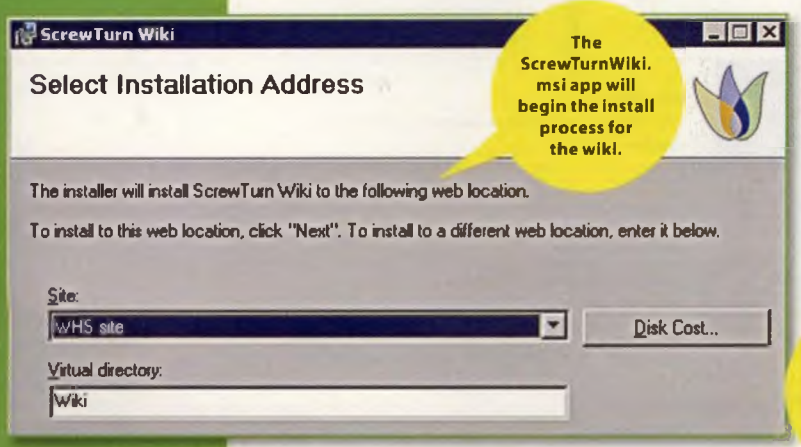
Run the application ScrewTurnWiki.msi, which will begin the installation process for the wiki. You'll be presented with a screen asking to confirm the site you wish to install the wiki on (in this case, use the default named "WHS Site") and the subdirectory to install the wiki on. The default is "Wiki" and this works fine for most people. Confirm the details and click next to proceed with the install, then click 'Finish' once complete.

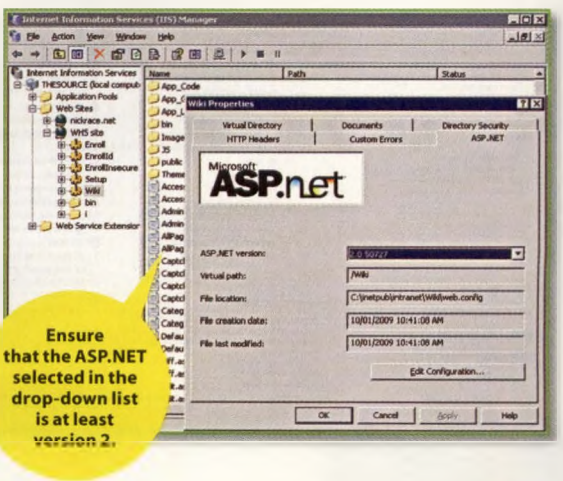
On the WHS desktop click 'Start > All Programs > Administrative Tools' then select 'Internet Information Services (IIS) Manager'. Once IIS Manager has loaded, using the tree structure on the left of the screen, expand Websites, then WHS Site. You should see a Wiki entry. Right-click and select properties, click on the ASP.NET tab and ensure that the ASP.NET selected in the drop-down list is at least version 2.

Next we need to configure and secure Screwturn with a small amount of rummaging around in the config file. Screwturn Wiki has been installed to C:\Inetpub\Intranet\Wiki if you used the default Website and subdirectory during the installation. On the WHS desktop, navigate to C:\Inetpub\Intranet\Wiki and open the Web.config file. The two settings we need to change are the 'PublicDirectory' key and the 'MasterPassword' key. Find the line that begins with <add key="PublicDirectory" and ensure that value is set to value="public\" />.

Similarly, with the line that begins with <add key="MasterPassword" change the value setting to a unique and secure password of your choosing. This will be the password for the Admin account for the wiki. It should look like this value="MyPassw0rd" />. Save and close the file.

Lastly, restart IIS. On the WHS desktop, click on 'Start > Run' then type 'iisreset' and hit enter. IIS will then restart itself. On your desktop system, open up a web browser and navigate to your WHS web site with the Wiki subdirectory, ie. **http://nicks.homeserver.com/Wiki** or **www.nickrace.net/Wiki** depending on your domain name setup. Start experimenting and enjoy!


ScrewTurn Wiki
Select Installation Address
The ScrewTurnWiki.msi app will begin the install process for the wiki.
The installer will install ScrewTurn Wiki to the following web location.
To install to this web location, click "Next". To install to a different web location, enter it below.
Site:
WHS site
Disk Cost...
Virtual directory:
Wiki



NETWORK ANALYSIS

Scan your network for weaknesses

You don't need to hire a pro to break into your network; there's network analysis tools that will turn you into a white hat hacker.

APC EXPERT

SIMON BISSON

Simon may not be a white hat hacker, but he's met one or two in his time. He definitely doesn't challenge you to hack him.

Dan Farmer's SATAN (Security Administrator Tool for Analysing Networks) was one of the first network analysis tools. Written in the mid-1990s by Farmer and IBM security guru Wietse Venema, SATAN bundled up a whole raft of network vulnerability testing tools into one package. Administrators could load it onto a Unix machine and let it rip, delving into holes that even the most diligent network engineers had forgotten to patch.

The result of SATAN's investigation was a comprehensive report that detailed where the problems were and how to fix them. No one had seen a tool like this before — especially one this easy to use. Panicked articles focused on the tool's name and declared that it was a tool for hackers, completely forgetting that SATAN was actually a tool to help stop crackers breaking into systems and that all it did was bundle up existing black-hat tools for over-worked system administrators. In the resulting furore, Farmer lost his job, but the foundations for a new class of security tools had been laid.

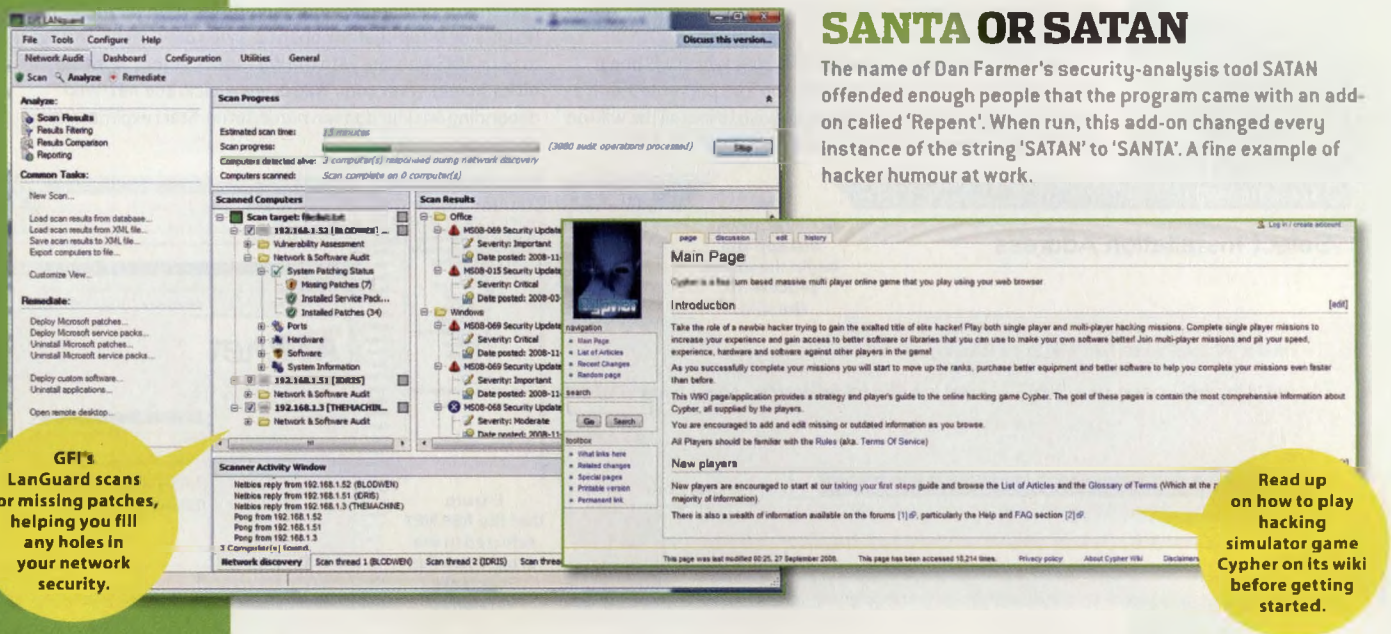
SCAN YOUR NETWORK

You can use the current generation of network analysis tools to test your own network both inside and outside your firewall. Tools like Nessus (**www.nessus.org**) are easy to use and free to download. You'll find packages for most operating systems, though the Unix versions are often the most mature. Commercial security scanners like GFI's LanGuard also help show up flaws, though they may not be as thorough as the more wide-ranging Nessus. Some of the latest generation of network-analysis tools will even manage to patch your systems for you by downloading system updates and remotely installing them on the machines that are most at risk.

Once you've downloaded a network scanner, install it on the machine that you intend to host your tests on. A laptop is a good idea because you can use it to scan any always-on broadband connections via a mobile broadband connection or from a friend's network. The result is a very detailed report of system vulnerabilities and a surprising amount of information about the systems you're running.

We ran Nessus over a typical small business network that supports a handful of laptops as well as numerous desktops, servers and network devices. The resulting report found several vulnerabilities that could have easily allowed someone with access to the network to quickly steal information and disrupt the network.

Not all the problems were ones we could solve (some were baked into NAS box and wireless router firmware), but all could be mitigated by locking down the network and increasing the security on its firewall.


GFI's LanGuard scans for missing patches, helping you fill any holes in your network security.
Main Page
Introduction
New players
Read up on how to play hacking simulator game Cypher on its wiki before getting started.

SANTA OR SATAN

The name of Dan Farmer's security-analysis tool SATAN offended enough people that the program came with an add-on called 'Repent'. When run, this add-on changed every instance of the string 'SATAN' to 'SANTA'. A fine example of hacker humour at work.

CODING

Unobtrusive JavaScript explained

Unobtrusive JavaScript is a really neat technique to separate the logic of dynamic HTML pages from the content.

APC EXPERT

LUKE AMERY

Luke Amery is a web technologist who works on shopping cart software. He is the technical director of On Technology, Australia's leading e-commerce development company.

Unobtrusive JavaScript lets you separate the layout and content from the "page logic" (for want of a better term). This leaves designers free to modify the design of the pages, and the scripts remain functional and effective. No more "don't change this part" directives to the artistes!

To get to the bottom of how this technique evolved a quick history lesson is in order. In the beginning there was just HTML, no script. Way back in 1995 Brendan Eich added JavaScript functionality to Netscape 2 (**http://en.wikipedia.org/wiki/JavaScript**). This made it possible to have web pages interact with the user without making a return trip to the web server — a very important advance. The original incarnations of JavaScript supported very simple document manipulation by allowing the script to "write" content into the page. It also had a rudimentary DOM (Document Object model), rudimentary in the sense that certain preordained properties were changeable such as document.aLinkColor (which would change the active link colour of hyperlinks in the document). The more important aspect that was available at this time was access to forms. This allowed client side validation of inputs. To achieve this back in the day you supplied a form onsubmit handler, best demonstrated by example (this code available online at **apcmag.com.au/unobtrusive.htm**):

```
<script>
function validateLogin()
{
if(document.forms["login"].elements["username"].value
== "")
{
alert("error");
return false;
}
return true;
}
</script>
.
.
.
<body>
<form name="login" action="login.cgi" onsubmit="valida
teLogin();">
Login: <input type="text" value="" name="username">
Password: <input type="text" value=""
name="password">
</form>
</body>
```

As you can see, the onsubmit attribute in the HTML wired up the logic to the action of trying to execute the form.

The world moved on however, with the advent of Internet Explorer 4. Microsoft took the rudimentary DOM that had been introduced in Netscape 2 and applied it to the entire document in a way that made everything an object that could be manipulated easily using JavaScript. This little branch of the browser wars made it possible (although unadvisable due to the sheer incompatibility of implementations at the time) to not embed script within the HTML. Our example above morphs into:

```
<script>
window.onload = function() { document.forms["login"].
onSubmit =
function()
{
if(document.forms["login"].elements["username"].value
== "")
{
alert("error");
return false;
}
return true;
}};
</script>
.
.
.
<body>
<form name="login" action="login.cgi">
Login: <input type="text" value="" name="username">
Password: <input type="text" value=""
name="password">
</form>
</body>
```

Yay! No script inside the body. Designers and HTML processing tools can now be used to manipulate the HTML and there is no fear that the script is going to be messed up.

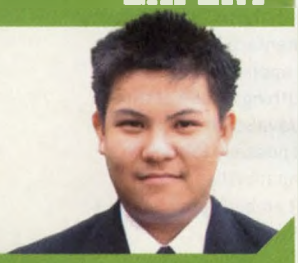
What happens when there are a few scripts that should be run given a particular event? All the popular JavaScript libraries such as jQuery and YUI wrap the browser's eventing system, making it as good as having DOM Level 2 Events implemented in any reasonably modern browser. Now you have the tools, go forth and get that inline script out of your HTML! BYTE

RIP AND BURN

Choose & archive optical media

Are you really confident that the CD or DVD you've just burned will be readable in a few years? Here's how to achive longevity.

APC EXPERT



GOUGH LUI

Gough has been experimenting with optical media since 2004. Working with people from online disc burning communities, he has done burn quality tests, media quality tests and firmware modifications. He was also a pioneer of over-burning DVD on the BenQ DW1640 and has made his contribution through beta-testing firmware and sharing his test results.

Anyone who burned a large number of CDs five or more years ago will know that many of those discs are no longer readable. It's enough to make anyone laugh at claims that some discs can last hundreds of years. But, from my experience, the majority would have been using cheap discs and did not follow the rules of burning for longevity.

Firstly, when choosing the right discs, it's important to know that many brands don't actually produce the discs. Sometimes they will chop-and-change between other suppliers yielding discs of various qualities. If you take a good look at the underside of the media you can familiarise yourself with the distinctive marks that certain manufacturers have. There is a free tool called DVD Identifier (**http://dvd.identifier.cdfreaks.com**) which reads the embedded manufacturer data to reveal who truly made the disc. For CDs, you can try Nero DiscSpeed (**www.cdspeed2000.com**).

The best discs are made by Taiyo Yuden and Mitsubishi Chemical Corporation. Taiyo Yuden is barely present in our market except for some enthusiast shops and duplicator supplies. They are often used as the benchmark for calibrating the standards and are made in Japan. Mitsubishi Chemical Corporation produces discs for Verbatim under its Datalife Plus branding and are highly recommendable as they produce good quality burns in most drives [indeed, *APC*'s own experience has been that Verbatim discs tend to be among the most reliable].

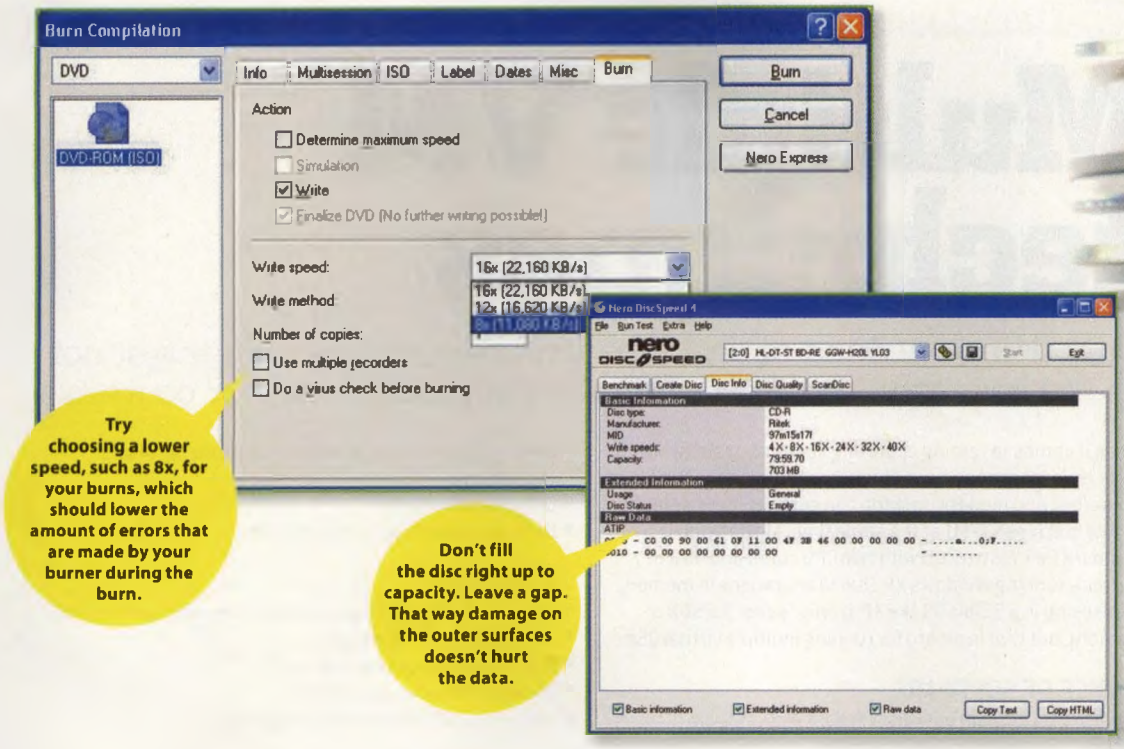
Good discs are usually made by companies such as CMC Magnetics (Imation and many other brands), Ritek Corporation (Ridata, many others), Daxon (BenQ), TDK, Fujifilm, Philips and LG Electronics. These discs are acceptable, especially for price and volume applications; however, their longevity and burn quality hasn't yet been proven up to the same level as the best discs mentioned above. As usual, for a better product, you will have to spend more.

The marginal discs usually come from companies such as Plasmon, Prodisc, Optodisc and Princo. Without a doubt, quite a few people have had bad experiences with these manufacturers. This usually involves the discs either physically disintegrating in a matter of a few years or burner incompatibilities and poor burn quality, resulting in data loss.

Discs to avoid are usually ones sold under unknown brands with country of origin marked as Hong Kong. Some of them will come up with blank media codes, 001, AML xxx, MEDIAID 001, etc. Others will hijack the media code belonging to another manufacturer. I would avoid it at all costs whenever there is any uncertainty.

DVD Identifier - Your DVD, HD DVD & Blu-ray Companion
Disc Options On-Line Help
Drive Selection And Drive Write Capabilities
Disc Identification
Unique Disc Identifier : [DVD+R:YUDEN000-T03-000]
Disc & Book Type : [DVD+R] - [DVD+R]
Manufacturer Name : [Taiyo Yuden Co. Ltd.]
Manufacturer ID : [YUDEN000]
Media Type ID : [T03]
Product Revision : [Not Specified]
Blank Disc Capacity : [Not Supported By Method 2]
Recording Speeds : [1x-2.4x , 4x , 6x-8x , 6x-16x]
[Method 2 Might Not Always Detect All Speeds]
Identify
Clipboard
More Info
Additional Information
Disc Identification Completed Successfully

DVD Identifier Disc Identification: this is a genuine Taiyo Yuden disc.



HOW TO MAKE LONG-LASTING ARCHIVES

SIX STEPS TO ENSURING THAT YOUR DATA IS SAVED EFFICIENTLY AND CORRECTLY.

1. Choose a good brand of optical disc as we've just explained how to do.

2. Burn all your data in one go. This means no multi-session discs and also no packet-writing. These technologies pose a problem in terms of compatibility and have failed more often than a disc burnt in one hit. I would also ensure the disc is empty as well to prevent any accidental damage by any other burners or software. I always avoid burning to the maximum capacity of the disc as the outside edge is usually harmed first. Burn quality usually suffers as we approach the outside edge. Make sure you turn on verification to make sure the burn was completed without errors.

3. Add in-built recovery. You may also optionally prepare your data by using dvdisaster or packing its archives with recovery volumes. Dvdisaster stores data on CD/DVD so that it's fully recoverable even after some read errors have developed (according to the dvdisaster project, error correction data is either added to the medium or kept in separate error correction files. Dvdisaster works at the image level so that the recovery does not depend on the file system of the medium.)

4. Burn discs at lower speed. Burning speeds of up to 16x are claimed for some DVD discs, and up to 52x for CDs, but if you burn at these higher speeds, your discs usually will have more errors in them (bit errors and higher jitter rates) which are masked by error correction. The inbuilt error correction can only handle a certain number of errors: the less errors induced by the writing operation provides a greater margin for error correction due to errors induced by the disc's age and chemical decomposition. Using quality media, I try to burn at 8x DVD and 24x CD.

5. Use newer drives or update the firmware. Newer drives do burn better than older ones, especially as the laser wears out and the power calibration drifts. Also, it would be a good idea to perform a firmware update: this involves going to your manufacturer's web site and downloading a software package which is flashed into the memory of your writer. This is a potentially risky procedure if not followed correctly, but its benefits include better compatibility and improved writing quality.

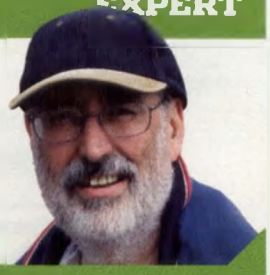
6. Store the discs properly. Always aim to store them in a dry, cool, dark place. Dryness prevents the reflective film from oxidation and the chemicals from degradation; coolness and darkness prevents the dye from degrading. It would be a good idea even with this procedure to check on the discs every two years and move them onto better media should technology progress. It is usually cheap enough and very worthwhile to make another copy of the discs in two years' time, in which case you will have two copies to make the journey into the future.

VIRTUALISATION

Multiple VM techniques

Only using one kind of desktop virtualisation software might not be the best solution. Techie **Mike Le Voi** picks horses for courses.

APC EXPERT



MIKE LE VOI

Mike is a software and performance technical specialist. He is a member of the worldwide Global Support Centre for Hitachi Data Systems. His main hobby is music in all its forms. He has multiple Roland and Yamaha MIDI keyboards and synthesisers.

When it comes to testing operating systems or software, there is no longer any need to use hard-to-manage dual-boot scenarios. Any modern desktop can support three or four virtual machines (VM) at the same time. My desktop is a standard Dell Vostro 200 with two CPU cores and 4GB of memory running Windows XP. Due to limitations in memory addressing in a 32-bit OS like XP, it only "sees" 3.25GB of memory, but that is plenty for running multiple virtual OSs.

CHOICE OF SOFTWARE

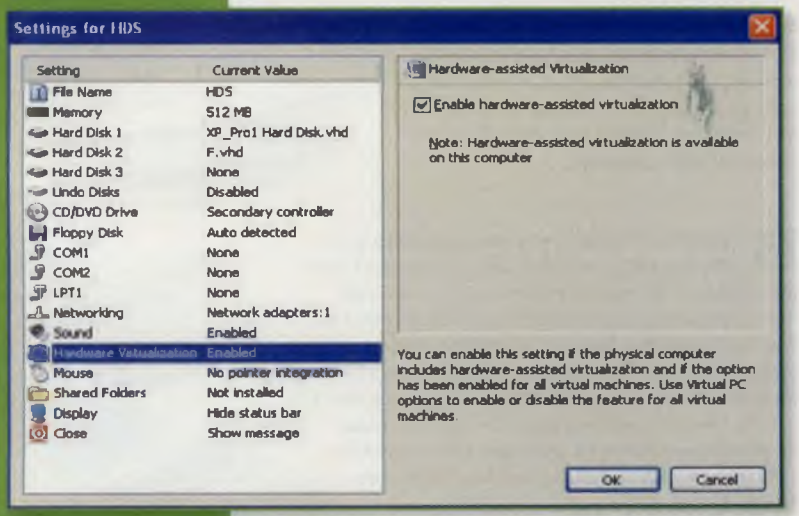
There are three main options: VMware Workstation, Microsoft Virtual PC 2007 (VPC), and Sun xVM VirtualBox (also known as VBox, which was used in a recent *APC* tutorial on virtualisation).

This article will concentrate on VPC and VBox, since both are free to use and can be downloaded from the Microsoft and Sun web sites. Taking the defaults for both installations has not caused me any issues. As a precursor to writing this article, I upgraded VPC to SP1 and upgraded VBox to Version 2.0.4. Again, I had no issues.

Why use two VM products? Each has its pros and cons. There are reasons to use both.

VIRTUAL PC

- Ease of install and use with XP and Vista
- Easy to clone multiple XP and Windows 2003 images for testing



- Almost impossible to do a quick, clean install of any Linux distro
- Only uses one core
- Default networking is more flexible

VIRTUALBOX

- Works well with XP, Vista and most Linux distros I've tried
- Harder to clone VM images
- Each VM has access to one core
- Default networking is only NAT
- VM can see USB devices if configured

VIRTUAL PC

In practice, I set up each VM with real networking, access to the sound card and 512MB to 1,024MB of memory. XP and Linux are normally OK with 512MB. Vista and Windows 2003 generally need 768MB to 1,024MB, depending on what software you are going to install in the VM. Once you have a standard, do not change it. I have sometimes altered a Windows VM, changing memory up and down as I saw fit. After a while, Windows complained about too many "hardware" changes and deactivated itself. At this point, you throw the VM away and clone the original. Of course, you generally do not have this issue with Linux.

Cloning is simple. A VM is composed of a VMC file, containing some XML which describes the hard disks and configurations, and one or more VHD files, which are the Virtual Hard Disks. Thus, if you have the following:

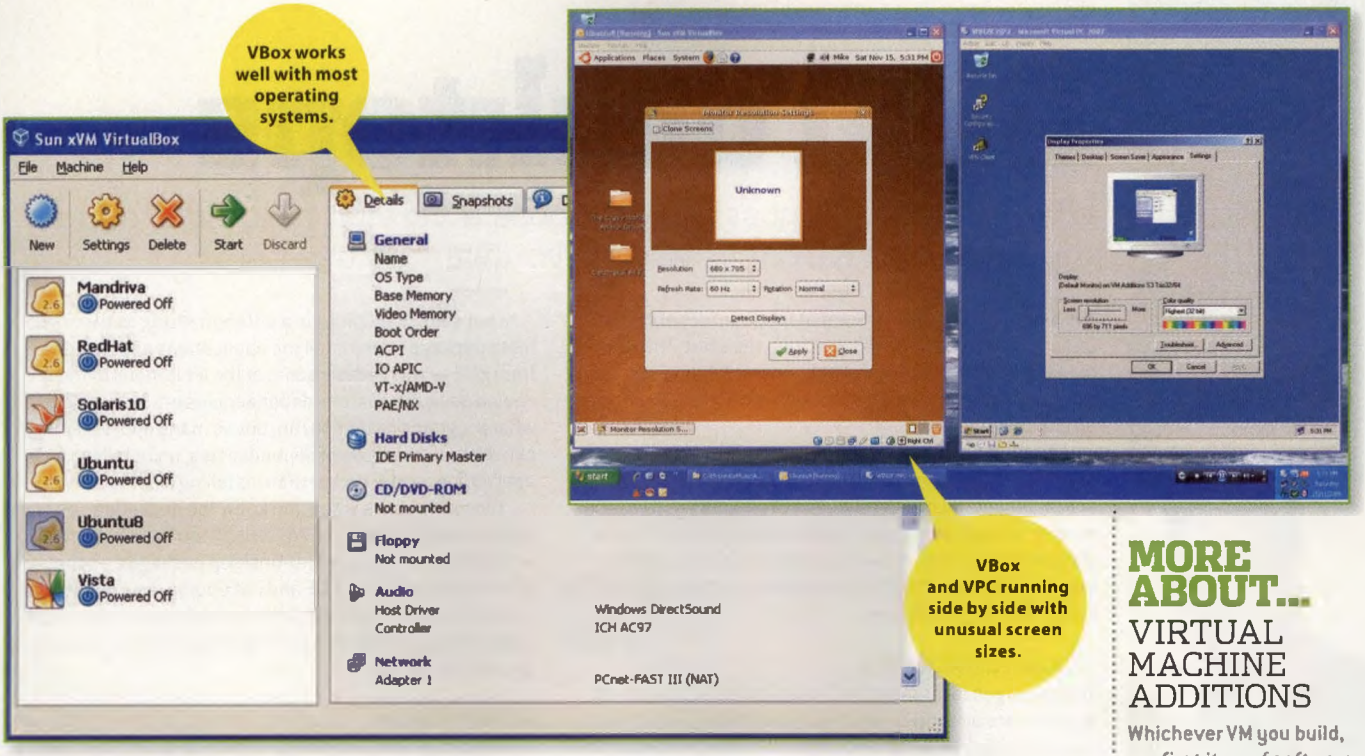
- D:\VM\Vanilla\CleanXP.vmc
- D:\VM\Vanilla\XP.vhd

You can clone this to be "TestXP" by simply doing the following:

- Create a new directory called D:\VM\TestXP
- Copy both files to the new directory
- Rename CleanXP.vmc to TestXP.vmc
- Use VPC console to "Add an existing Virtual Machine" and choose the new VMC file

You cannot start both VMs at the same time with networking as they both have the same machine name and IP address. You can, of course, start "TestXP" and immediately give the "new" Host a different name and IP address. However, your ability to use both at the same time is limited by your licensing agreement for Windows software.

The bad news with VPC is that by default it supports 16-bit video for backwards compatibility. For some reason,



a Linux default install usually requires 24-bit video support so you just get a garbled screen when the install finishes and you have to resort to Linux tricks to be able to see the GUI at all. Using VBox is much easier.

VPC only supports one core for all running VMs. Of course, this can be an advantage as you then have use of the other core for other tasks not associated with the VM.

Finally, VPC default networking is easy to use and flexible. If you set the network option to be "Local", each VM can only see another VM. I always set networking to use a real IP address as quite often my VMs need to access real devices on the network.

VIRTUALBOX

VBox works well with most OSs. I have personally tried Ubuntu, Solaris, Mandriva, Red Hat and Vista. The latest version of VBox supports hardware assisted virtualisation, as does VPC. In practice, I have found that if a VPC VM is running, and I attempt to start a VBox VM, the VBox VM will not start as it complains that another program is already using the hardware assist feature. This appears to happen even if I uncheck the option to use hardware assist in VBox. Either this is a bug, or a setup issue. I have never bothered to find out which, as I now always start the VBox VMs first and then start the VPC VMs. VPC does not care if VBox VMs are already running.

Cloning in VBox is harder as the control mechanism for each Virtual Hard Disk (VHD) is the disk UUID. Each registered VHD must have a unique UUID. So, you cannot simply copy files as with VPC and attempt to register both at once with the management GUI. You can use VBox utilities to copy a VHD and change the UUID. However, this rewrites this information into the actual VHD. Some Linux distributions have been known not to boot as a result of this change. For Windows, it is worse, as the OS typically complains about "hardware changes" and once again you have a deactivated copy of Windows.

To get around this, you can automate cloning using VBox Command Line Interface (CLI):

- Unregister the old VM using CLI
- Copy the files to a new directory
- Register the new VM using CLI

Of course, with this technique you can never have both the old and new VM active or registered at the same time.

When each VM is started a new task is spawned. Thus, each VM can have access to one core. This means that running multiple VMs can be faster, at the expense of access to the CPU cores from the real OS. Personally, I have never had an issue with VPC using only one core. Modern PCs are so fast compared to 5-10 year old technology that I do not care.

Default VBox networking is only Network Address Translation (NAT). This means that the VM can see the internet and the network, but devices on the network cannot "communicate" with the VM. VBox now supports Host Interface Networking. However, after my experiences with VMware and VPC, I have not been game to test this.

Finally, VBox has the ability to use raw USB devices. I have not tried this so I can't make comments on how useful it is.

FINAL THOUGHTS

For the software testing that I do, virtual machines are an indispensable part of my working day. They also allow me to try out Linux distros without any possibility of "destroying" my working XP machines. I recommend that if you are an XP or Vista user that you install both sets of software and use the one which is most appropriate for the job. Have fun!

MORE ABOUT... VIRTUAL MACHINE ADDITIONS

Whichever VM you build, the first item of software you should install is the appropriate Virtual Machine Additions package. This allows you to move the mouse in and out of the VM "window" seamlessly. Without this, once you click in the VM, the mouse and keyboard are "captured" until you hit a special key combination.

Also included is a video driver. This enables you to drag the edges of the VM window to resize it. I run my 24in widescreen monitor at 1,440 x 900 for size and convenience. Thus, I generally run my VM at 1,024 x 768. With VM additions, however, I can make the VM screen size anything I want. Above is a screen shot of VBox and VPC running side by side with unusual screen sizes.

Some Linux distros, like Mandriva, come with VM Additions already installed. This makes installation of Linux very easy indeed.

OPEN SOURCE CHALLENGE

Dual desktops

Ubuntu makes it possible to choose a version tailored around the Gnome or KDE, but what if you want to use both?

APC EXPERT

ASHTON MILLS

Editor of the Linux Pocketbook series, and now with *CHOICE Computer* magazine, Ashton has been a technology journalist for 13 years, including five years with *APC*. Ashton has been using Linux since Slackware came on floppies, and before that he was one of the three people in the world who used OS/2 (and loved it). Always ready to make the most of his PCs, he is constantly playing with Linux distributions and compiling the latest kernel. This is his idea of fun, and that's why we get him to write for *you*.

The default desktop environment for Ubuntu is of course Gnome, which has served it well from the start. The KDE desktop is almost as fashionable, however, and as a result the alternative Kubuntu distribution is officially supported by Canonical as well.

Usually when you install Ubuntu you download an install CD or DVD of either Ubuntu or Kubuntu to get Gnome or KDE respectively, but having both on your system doesn't have to be mutually exclusive — or even entail a dual-boot. If you have Ubuntu installed already, you can install the full KDE desktop environment side by side and log in to either as you choose.

KUBUNTU PACKAGES

The packages to install the KDE desktop as bundled with Kubuntu are already in your Ubuntu repositories. All that's required to get a KDE desktop up and running is to install the required base packages and their associated dependencies. Fortunately, you don't need a degree in package dependencies to work out what's required to install KDE — there's already a meta-package to do exactly this for you.

From the command line, simply run:

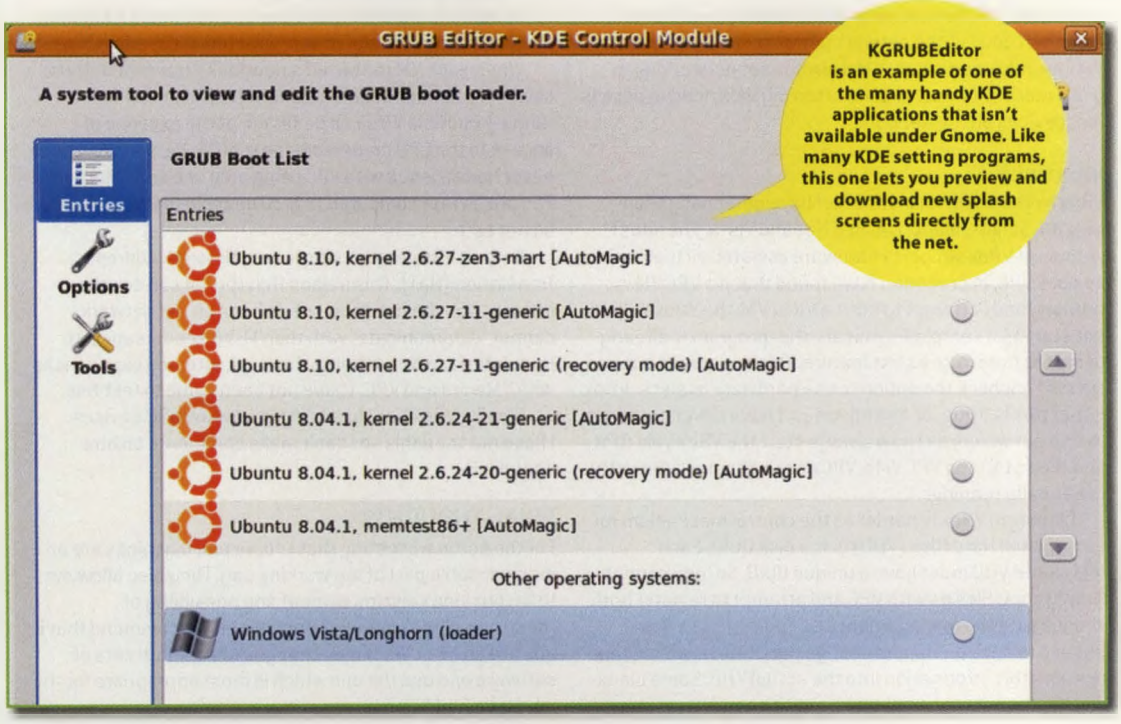
```
sudo apt-get install kubuntu-desktop
```

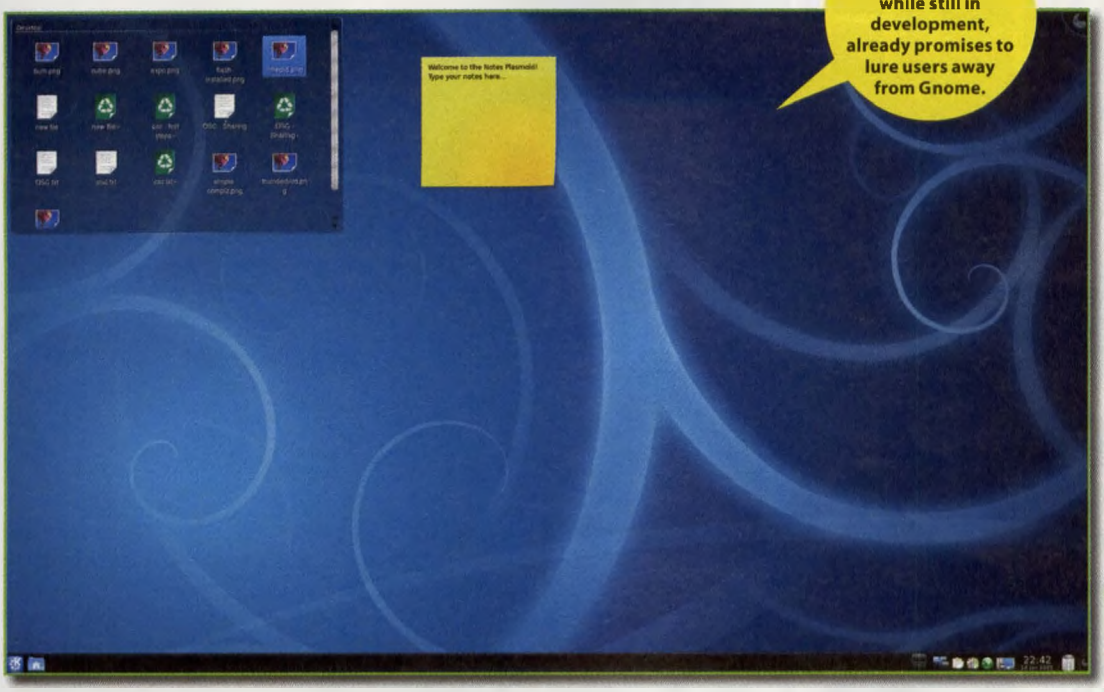
That said, removing it is a different story, as there's no meta package to uninstall the applications and libraries from KDE — this reveals some of the limitations of the debian package system: dependencies are managed in what programs *require* to run, but as many applications can share a multitude of dependencies, uninstalling an application can be tricker than installing it.

The exception is when you know the dependencies and they are self referencing. Which isn't too hard to determine with respect to the kubuntu-desktop packages, as they are all interdependent on KDE and not Gnome. As a result, you can uninstall the Kubuntu desktop packages with a single (albeit long) command. See 'Removing Kubuntu' below if you want to do this.

GDM AND KDM

During install you'll be prompted to choose whether you want the KDE display manager (KDM) or the Gnome display manager (GDM) to manage your graphical logins. They are much the same, each utilising the toolset the desktops are based on (Qt and GTK respectively). If you want to see what KDM looks like, select it and it will be shown when you logout or reboot. Later, if you prefer GDM, you can restore it like so:


GRUB Editor - KDE Control Module
A system tool to view and edit the GRUB boot loader.
Entries
Options
Tools
GRUB Boot List
Entries
Ubuntu 8.10, kernel 2.6.27-zen3-mart [AutoMagic]
Ubuntu 8.10, kernel 2.6.27-11-generic [AutoMagic]
Ubuntu 8.10, kernel 2.6.27-11-generic (recovery mode) [AutoMagic]
Ubuntu 8.04.1, kernel 2.6.24-21-generic [AutoMagic]
Ubuntu 8.04.1, kernel 2.6.24-20-generic (recovery mode) [AutoMagic]
Ubuntu 8.04.1, memtest86+ [AutoMagic]
Other operating systems:
Windows Vista/Longhorn (loader)
KGRUBEditor is an example of one of the many handy KDE applications that isn't available under Gnome. Like many KDE setting programs, this one lets you preview and download new splash screens directly from the net.



Kubuntu uses the new KDE 4, which, while still in development, already promises to lure users away from Gnome.

HAVING BOTH ON YOUR SYSTEM DOESN'T HAVE TO BE MUTUALLY EXCLUSIVE

```
sudo dpkg-reconfigure gdm
```

Using 'kdm' will work as well since you have both installed, and either will start the same dialog allowing you to choose the default.

BEFORE YOU LOGIN

Note that while you can install kubuntu-desktop (KDE) alongside ubuntu-desktop (Gnome), keep in mind each is designed to operate as a single desktop. What this means is that while you'll be able to switch between either desktop as you like, and indeed take advantage of many new KDE applications showing in your GNOME menus as well as on the KDE desktop, this can be considered an annoyance if you like to keep things minimal.

For this reason, if you're just looking to explore the Ubuntu KDE desktop, we recommend creating a new user to login with. This way the KDE desktop configuration files won't be generated under your normal user account, and if you uninstall it later you won't have excess junk in your home directory. If you like what you see, and want to mix both desktops, you can always login under your normal account later.

To add a new user, for example 'kdetest', run:

```
sudo adduser kdetest
```

And then follow the prompts. Then, when you're ready, logout of your Ubuntu desktop and login with your new user.

LOGGING IN

Regardless of if you use GDM or KDM, when you log in you'll see a 'Select session' button. If you click this and select 'KDE', and then type in a username and password, you will login to KDE instead of Gnome. You will be prompted to choose whether to make this the new default, or log in just this once. Obviously unless you actually want to switch to KDE, you should choose 'Just this once'.

Beyond that, explore! KDE operates quite a bit differently to Gnome in some areas, and there is a wealth of applications that are worth trying.

Indeed, even if you don't want to use KDE as your main desktop you will find many excellent programs — like Amarok (a brilliant music manager and player) and k3b (a polished CD and DVD authoring program), not to mention the Konqueror web browser based on the KHTML rendering engine (a version of which is also used by Apple for Safari in Mac OS X, and by Google for Chrome) — that you can launch from your Gnome desktop regardless.

REMOVING KUBUNTU

As detailed earlier, the kubuntu-desktop meta-package defines the packages that make up a KDE installation, but uninstalling this only uninstalls the meta-package itself, not the KDE applications, libraries, and dependencies. Fortunately, you can enter these at the command line and remove a kubunutu-desktop installation with one command. Unfortunately, it's not a short one!

In fact, rather than type it out it's easier if we just point to one of the sources online where you can cut-and-paste the whole command. Head to **www.psychocats.net/ubuntu/puregnome** and copy the 'Remove Kubuntu' command into a terminal.

MORE ABOUT... WHICH KDE?

Which version of KDE does Kubuntu use? Although the new generation of KDE is version 4, which is still maturing, it has none-the-less become the default version for Kubuntu, replacing the older 3.5.10. The version at the time of writing is 4.1.4, and while it does have a few quirks, the upcoming 4.2 promises a lot more polish for what is becoming an innovative alternative for the desktop paradigm.

The upcoming KDE 4.2 release offers significant enhancements over 4.1, including new UI design changes and an improved theme.

ALSO... REMOVING THE SPLASH

You may find that installing the kubuntu-desktop meta-package has also replaced your bootup splash to be the Kubuntu theme instead of Ubuntu. If you want to restore this, enter the following:

```
sudo update-alternatives --
config usplash-artwork.so
```

Installing the kbuntu-desktop meta-package also replaces the loading splash screen; however, you can restore the Ubuntu splash screen easily.

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IN THIS ISSUE

98 Build the Ulitmate PC — learn how to make a powerful distributed computer with little more than a stretch of network cable and a switch
104 Delve into chaos with Excel — draw a bifurcation diagram on your PC

NETWORKING

Build the Ultimate PC

Graham Morrison uses little more than a cheap switch and a stretch of network cable to build a powerful distributed computer.

WHAT YOU'LL NEED

MULTIPLE PCs
In order to build your network.

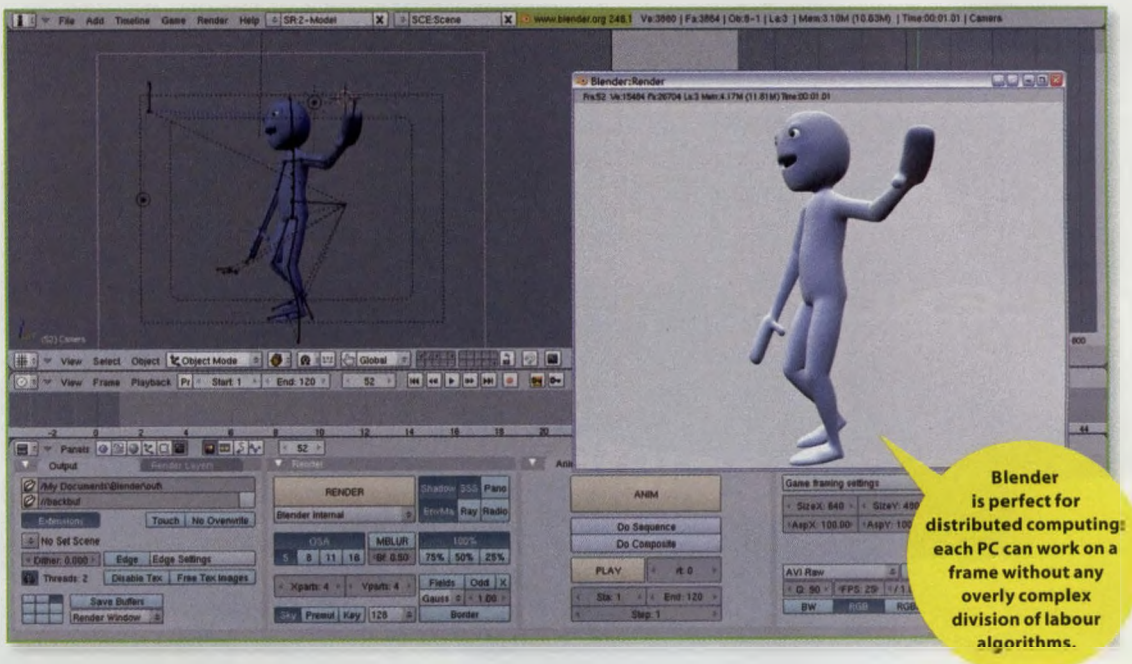
UBUNTU LINUX
This is the OS we'll use to network our setup. Download the latest version from *www.ubuntu.com*.

A GIGABIT SWITCH
To connect the machines at their maximum speed capacity (with Ethernet cables).

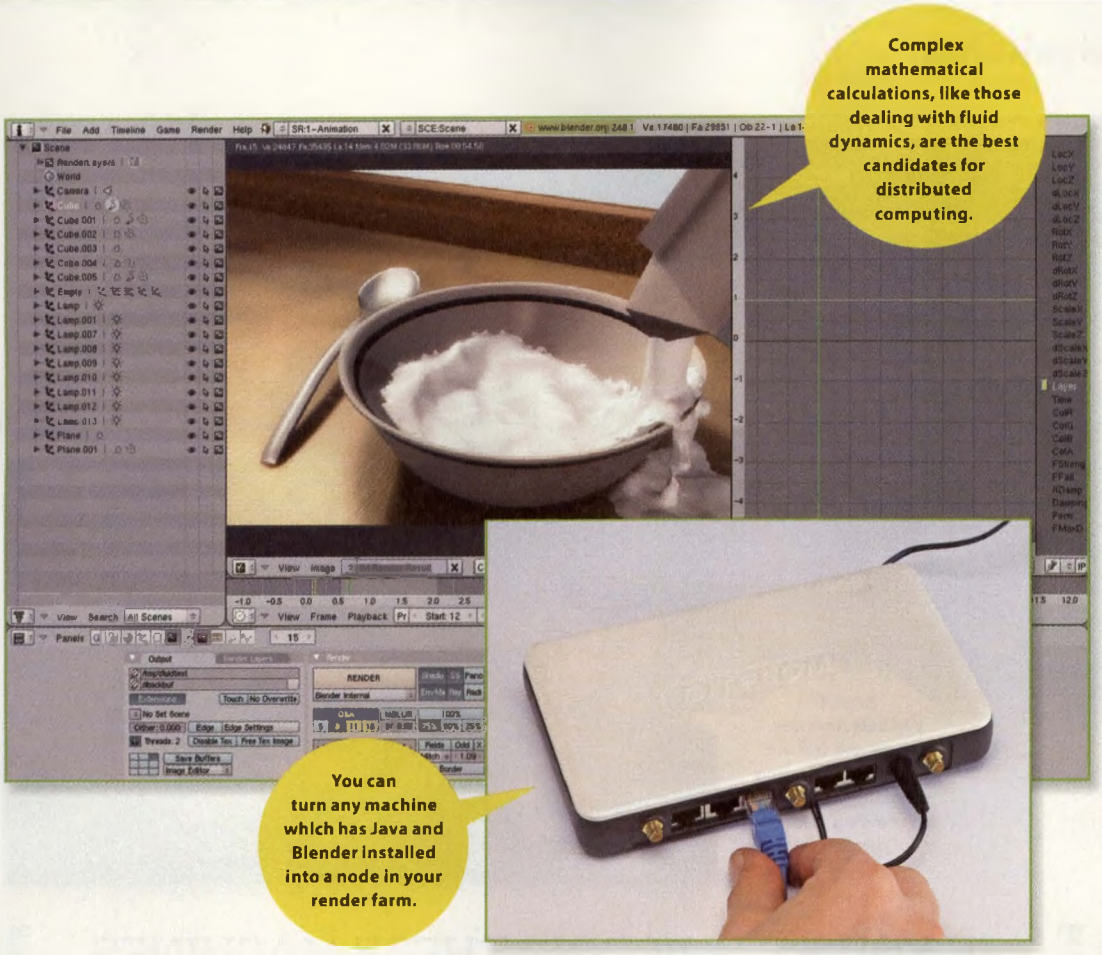
You can never have enough processing power, especially if you're working with 3D graphics or compiling your own software. Pleasingly, with a very small outlay, it is easy to use any spare machines you may have to create a single homogeneous computing mega-matrix and calculation engine just by wiring them all together and running the right software.

Even modest hardware can make a significant contribution to your net computing power, and if you've already got the hardware then you've got nothing to lose. PC hardware is now so cheap that buying a couple of extra machines and wiring them into the same computing pool could make a very cost-effective expansion. This is what we are going to build, and we're going to use Ubuntu Linux to do it. Linux can take cluster computing tasks in its stride, and you don't need to fork out for a licence for every machine.

Before embarking on this endeavour, we need to make one thing clear. The combined processing power of a cluster of computers can only be used for certain applications. You won't be able to boost your frame rate on Crysis or Far Cry 2,



Blender is perfect for distributed computing: each PC can work on a frame without any overly complex division of labour algorithms.


Complex mathematical calculations, like those dealing with fluid dynamics, are the best candidates for distributed computing.
You can turn any machine which has Java and Blender installed into a node in your render farm.

for example, and you won't be able to run your everyday applications across the cluster unless they're designed to do so. Neither are we building a Beowulf cluster, where you'd need to use specialised libraries and programming languages to take advantage of the parallel processing potential within the cluster. We're going to work with distributed computing, which involves splitting up a task across several machines in a local cluster.

As a result, our applications can be far more down to earth and practical. You will be able to dramatically reduce rendering times with Blender, for example, or the compilation time of major apps like the GNU/Linux kernel. You'll also be able to parallelise any number of tasks and use each machine separately from your master if you wish. As with multicore processors, there's some inefficiency when scaling jobs across a cluster of processors, but it will almost always be much faster than without the processor working.

In theory, you can use any old PC. The minimum requirement is that it must be able to run Linux; so that narrows the choice down to almost any PC from the last 10 years. But, in reality, the cluster works best if the machines that you're linking together are relatively close in specification, especially when you start to take running costs into consideration.

A 1GHz Athlon machine, for example, could cost you over $100 a year in electricity costs. You'd be much better off spending this money on a processor upgrade for a more efficient machine. A similar platform for each computer also makes configuration considerably easier. For our cluster, we used four identical powerful machines. You only need powerful machines if you're making a living from something computer-based (3D animation, for instance), where you can weigh the extra cost against increased performance. We're also going to assume that you have a main machine you can use as the master. This will be the eyes and ears of the cluster, and it's from here that you'll be able to set up jobs and control the other machines.

HARDWARE COMPATIBILITY

Linux has come a long way in terms of hardware compatibility, but you don't want to be troubleshooting three different network adaptors if you can help it. And it's the network adaptors that are likely to be the weakest link. Cluster computing is dependent on each machine having access to the same data, and that means that data needs to be shuffled between each of the machines on the network cluster continually. Due to the heavy data requirement, wireless is too slow for almost any task, so you're going to need a physical connection between each machine. The faster your networking hardware, the better. To start with, you should be fine with your standard Ethernet ports as long as they're capable of megabit speeds (100Mbit/s). If you need greater capacity, Gigabit Ethernet cards are also cheap. Just stick them into a free PCI or PCI-X slot, and then disable the slower port if you can.

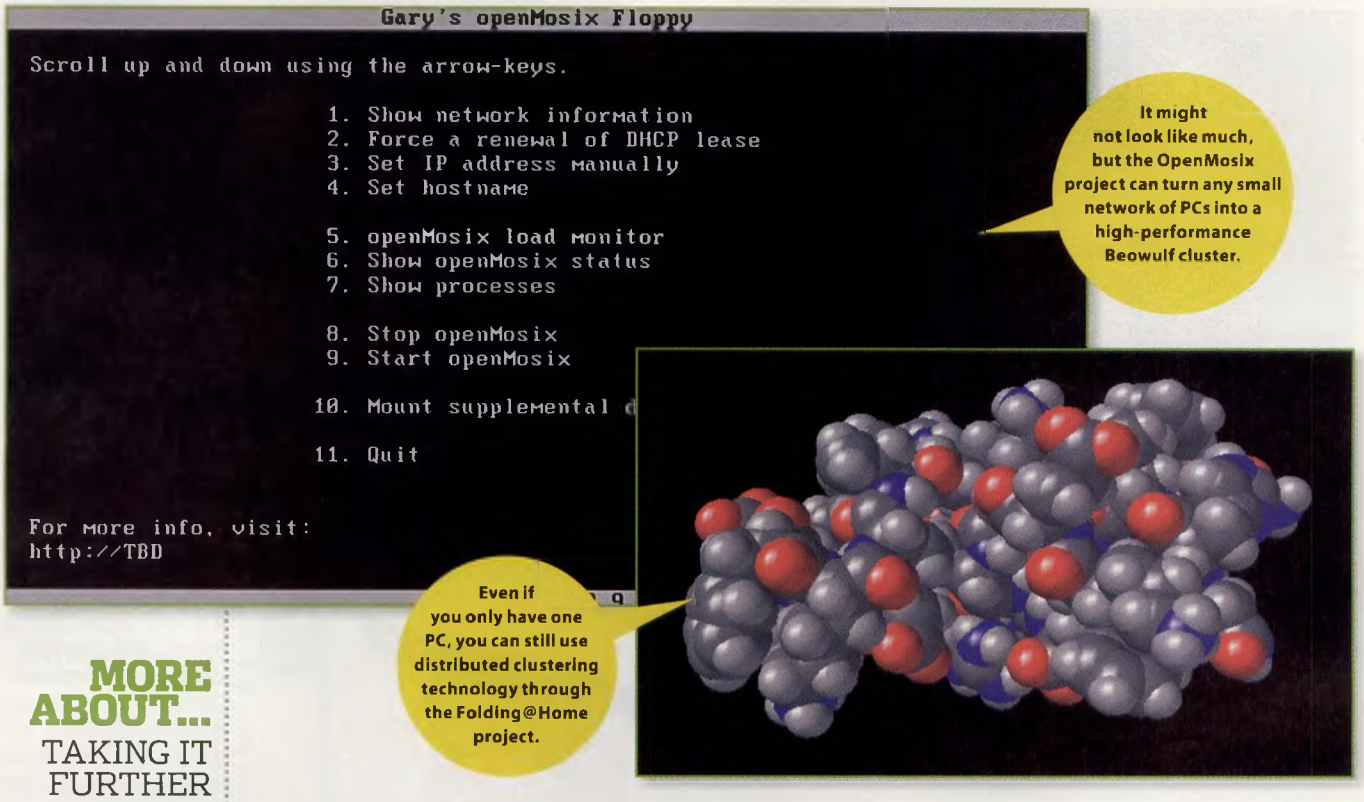
You'll also need a way of connecting the machines together. A Gigabit switch can be bought for around $50, and this will let you connect each machine together at the maximum speed capacity. You may be able to use the Ethernet ports on an internet or wireless router, but most will only be able to handle megabit speeds. It might be a good idea to start out using your standard Ethernet ports and your internet or wireless router and upgrade to a

DO THIS...
CREATE SHARED STORAGE

Most distributed computing tasks require access to the same data. The simple Blender setup, for example, needs each PC to write its output to the same directory. Fortunately, this is exactly what Linux was designed for. The software behind folder sharing is called Samba. It's a recreation of Microsoft's own folder-sharing protocol, so it's compatible with both Microsoft and Mac networks. To enable Samba, right-click on the folder that you want to share and choose 'Sharing Options'. Tick 'Share this folder'. Confirm you want Samba to be installed, and after a brief download, you'll need to restart your desktop session. After restart, right-click on the same folder again and open the Sharing Options window. Now when you tick the 'Share this folder' checkbox, nothing will need to be installed. Then enable write access to the folder by ticking the checkbox. Lastly, open a terminal from the Accessories menu and type 'sudo smb password -a username', replacing 'username' with a node account name. You will also need the remote node's password. Type 'sudo /etc/init.d/samba restart' and you're ready to go. Install both the Samba and Smbfs packages using Synaptic on each machine, then type the following to mount the remote folder onto the local filesystem:

```
sudo mkdir /mnt/remote
sudo mount -t smbfs -o
user=username //server/
sharename /mnt/remote
```

Simply switch 'sharename' above for the name of the folder that you enabled sharing for.


Gary's openMosix Floppy
Scroll up and down using the arrow-keys.
1. Show network information
2. Force a renewal of DHCP lease
3. Set IP address manually
4. Set hostname
5. openMosix load monitor
6. Show openMosix status
7. Show processes
8. Stop openMosix
9. Start openMosix
10. Mount supplemental d
11. Quit
For more info, visit:
http://TBD
It might not look like much, but the OpenMosix project can turn any small network of PCs into a high-performance Beowulf cluster.
Even if you only have one PC, you can still use distributed clustering technology through the Folding@Home project.

MORE ABOUT... TAKING IT FURTHER

The best thing about working with a cluster of machines like this is that you can easily expand your network to meet any growing requirements. If you find yourself needing a larger render farm, for instance, all you have to do is add another machine to the network. But if you find you've got a taste for distributed computing, there are far more technical avenues that you can visit to fuel your hobby. If you're looking for a challenge, we would recommend the now defunct OpenMosix project. This is a series of patches for the Linux kernel that are used to build a Beowulf cluster. When OpenMosix is running, CPU-intensive processes running on the cluster are automatically distributed to the various nodes on the network, making it an ideal solution for custom-built mathematically intensive processes and data analysis.

[IF YOU'RE BUILDING THESE MACHINES FROM SCRATCH, YOU CAN CUT CORNERS]

dedicated switch and ports later on.

As for general PC requirements, that depends on how you plan to use your cluster. Memory is more important than processing speed because it's likely that you'll be using your combined computing power for large, memory-intensive jobs. That means lots of images and textures in the case of 3D rendering, or lots of libraries, objects and source files in the case of distributed compilation.

Each node in a cluster will normally operate independently of the rest. If one machine has a lower specification, it shouldn't be too much of a bottleneck, but this depends on how you use your cluster. If you're rendering a 300-frame animation and the slow machine happens to render only a handful of frames, then it has still made some contribution without holding any of the other machines back. But if the same machine is used to help render a single complex frame, it's likely that you'll need to wait for the slower machine to complete its work after the faster machines have finished.

RE-USING HARDWARE

If you're building these machines from scratch, you can cut corners. Other than for installing the OS, you won't need a keyboard, mouse, optical drive or screen. You can even avoid using an optical drive for installation by using a tool called UNetbootin. This generates an Ubuntu USB stick installation from a standard CD image. However, its success depends on the capabilities of the system BIOS within each machine. BIOS settings are normally accessed by pressing a certain key when you boot your machine. This key is most commonly F2, but it could also be F1, Delete or Escape. Look for any on-screen messages at boot for a clue. From the BIOS you should be able to discern whether your system can boot off external USB devices. You should also disable 'halt on all errors' if the option exists. This means that your machine will boot even when there are errors or problems detected, which is what you need if the machine complains that no keyboard, mouse or screen has been detected.

Internal storage needs are minimal. You need around 10GB for the operating system, and it's going to be difficult to find a hard drive that small these days if you haven't got one or two handy. For storing your project data, we'd recommend using either a large drive (or array) on the master machine, or use an external NAS device connected to the same switch as the other machines in the cluster. Linux can mount remote drives onto the local file system so that apps treat the remote storage as if it were local.

Each machine needs to be connected to the switch that we mentioned earlier using a standard Ethernet cable. You also need to connect the switch to your internet or wireless router. A router is needed to assign a network address to the machines in the cluster; this should happen automatically thanks to the DHCP server running on the router. If you don't want to use a router (or connect your cluster to the internet), use your master machine as a DHCP server. This will create IP addresses for each machine on the switch.

6 STEPS PROCESS SUMMARY

Install Linux on a node along with packages for remote admin.

1 BURN A LINUX BOOT DISC

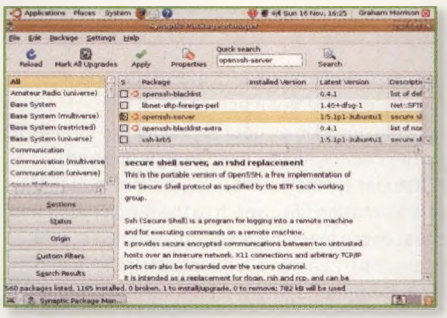
Burn the Ubuntu disc image and boot each node in turn. Ubuntu is easy to install, so we'll only cover building the distributed computing cluster. Choose 'Install Ubuntu' from the Boot menu.

2 PARTITION MAGIC

Be warned, the Prepare Disk Space step will repartition and reformat your drive. Ubuntu should work around an existing Windows install, but you should back up your data first so you don't lose it.

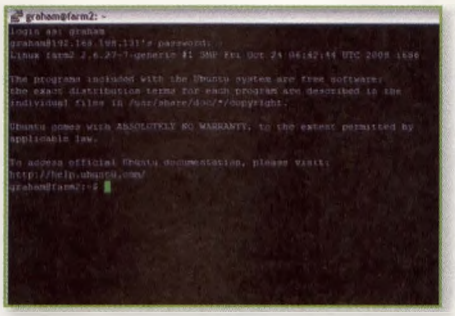
3 CREATE A NAME

On the Who Are You? page, make sure that you enter a unique name for the computer. This name is used by most networking apps, and you should have a different one for each node in your network.



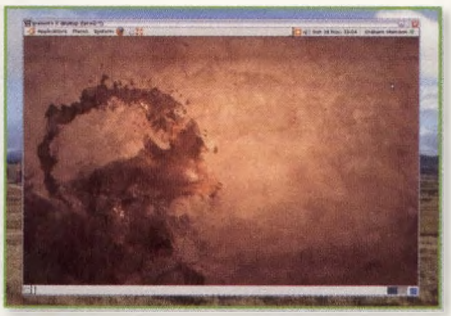
4 REMOTE ACCESS

Ubuntu will now be installed. For remote admin you need to install the 'openssh-server' and 'tightvncserver' packages from the Synaptic package manager in the Administration menu.



5 USING A NODE

Once the remote admin packages have installed, you can use the master desktop to connect to a node using Putty (Windows) or SSH (Linux). You'll need its IP address, username and password.



6 REMOTE SESSION

With the command prompt on the remote machine open, type 'vncserver :1'. This will create a new remote desktop session. You can now use VNC clients to access remote desktops on any nodes.

INSTALLING THE SOFTWARE

With the hard stuff out the way, it's time to install the software. We used the latest version of the Ubuntu Linux distribution, Intrepid Ibex. Ubuntu is our first choice because there is such a wide variety of packages available, and these can be installed through the default package manager without any further configuration. This makes installing apps like Blender across your cluster as easy as typing a single command on each machine, and it also means that you can install support utilities such as the Dr Queue rendering queue manager just as easily.

We opted for the Desktop rather than the Server version. This was because we still need the desktops on each node for setting up our various tests, and while we could still do the same with the Server edition (which by default has no desktop), configuration would be easier with a desktop.

Installing Ubuntu is easy but a little tedious, as you need to go through the following routine for each machine. After creating a burned CD from the ISO image of the distro, boot each machine in turn with this disc in the optical drive. If it doesn't boot, check the boot order in your BIOS. Next, choose the 'Install Ubuntu' option from the Boot menu and answer the resulting questions. On the Partition Options page, use the entire disk for the installation (unless you're sharing the machine with a Windows OS), and create the same user account on each machine. This makes setting up the shared storage device easier.

You should also give each computer within the cluster its own name (on the 'Who Are You?' page). Installation can take up to 45 minutes, depending on the speed of each node. When finished, your machine will restart and you'll need to log in to your new desktop. It's likely that you will also have to install a few security updates; a small yellow

3 STEPS PROCESS SUMMARY

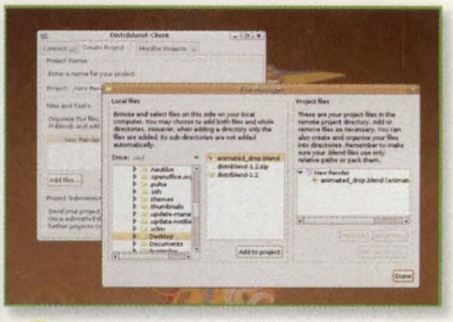
Install the Distriblend render queue manager on each machine.

1 INSTALL JAVA

Distriblend is a Java app, and it needs a bona fide Sun version of the cross-platform development kit. Use Ubuntu's Synaptic package manager to install 'sun-java6-jre'.

2 GET DISTRIBLEND PACKAGE

Visit the Distriblend web site (*http://netblend.sourceforge.net*) and download the default binary distribution package. Once downloaded, unzip the files to a new folder.



3 RUN THE FARM

Right-click on the files and select 'Open with Java 6 Runtime'. You need to run 'node.jar' on each node, 'client.jar' on the master machine and 'distributor.jar' on the server.

TIP...

If you're a programmer or kernel hacker, install a tool called 'dcc'. This is a replacement for the 'gcc' compiler. After you've edited a couple of configuration files, you'll be able to distribute almost any compilation job to the nodes on your cluster without touching the source code.

balloon message will open if these are necessary. The next step is to install the control software.

New applications and software can be installed through the Synaptic package manager. This can be found in the 'System > Administration' menu. First, you need to search for a package called 'openssh-server'. In Synaptic click on the package to enable it, followed by 'Apply' to download and install it. You need to do the same for a package called 'tightvncserver'. Both of these tools are used for remote administration, so you won't need them if you plan to keep a keyboard, mouse and screen attached to your nodes.

To connect to each machine from a master device running Windows on the network or one of the Linux machines, you need to use an SSH client. The most popular application for Windows is the freely available Putty, while Linux users can simply type 'ssh -l username IP Address' into the command-line. To find the IP address of each node, either use your router's web interface for connected devices (if it has one) or right-click on the Network icon on the Ubuntu desktop and select 'Connection Information'. If you're using the command line, type 'ipconfig'.

From an SSH connection, you can launch a remote desktop session by typing 'vncserver :1' followed by a password. When the remote session is active, you can connect to a desktop session on each machine using a VNC client such as TightVNC Viewer for Windows or Vinagre for Ubuntu. When specifying the address to connect to, make sure that you follow the IP numbers with ':1', as this is needed in order to specify which screen session to connect to.

TESTING THE CLUSTER

Now that everything is running as it should, let's test the combined power of the cluster. The easiest method that we've found (and the one that provides immediate results) is to use Blender, a professional-quality open-source 3D animation system that's particularly mathematically intensive. It's designed to work with more than one instance running on different machines.

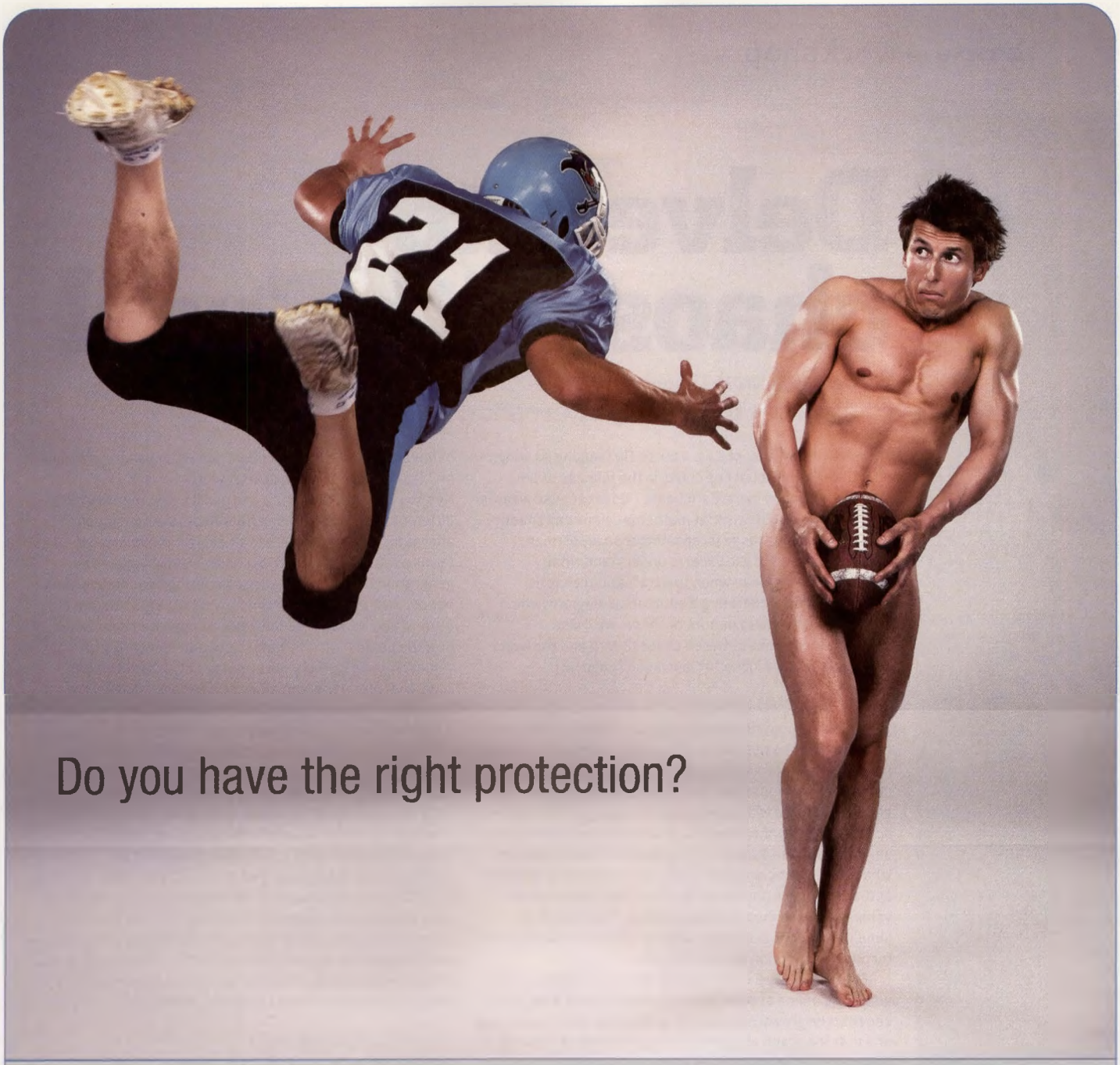
You can easily run a job on your server before farming it out to the entire cluster. All you need to do is open an instance of Blender on each machine, get them to read the same '.blend' animation file, switch to the Output page and make sure that every machine is writing its output to the same directory. You then need to enable both the 'Touch' and 'No Overwrite' options. When rendering is started, each Blender instance will grab the next available frame that hasn't been created by another. It's an effective and pretty quick way of spreading the load.

There are two downsides to this option. Firstly, you'll need to have a screen connected to each node because Blender won't run over VNC. Secondly, Blender will only work with animations. Single-frame images can't be distributed. Alternative solutions are more complicated, but happily, both of these problems can be overcome by installing a render farm queue manager.

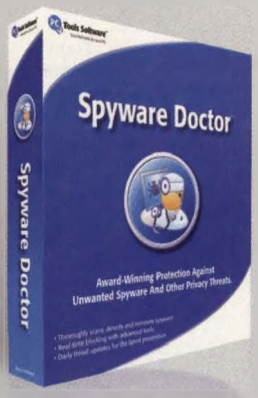
The best tool that we found was Distriblend. This suite of free Java tools automatically distributes Blender jobs between the various nodes of your cluster. You use a client to add Blender jobs to a distributor that then sends the jobs on to each node.

We used Distriblend for our distributed rendering benchmarks, and we were able to almost quadruple our processing speed across our four machines. The render time for a 120-frame, 640 x 480 resolution character animation example from Blender Nation was cut from two minutes to less than 30 seconds. On a more complex fluid dynamics job ('Vector blurred fluid' by Matt Ebb), we saved ourselves over two hours by distributing the 50 frames of animation across our cluster. And that's just the beginning.

If you love 3D graphics, this soon feels like the only way to render. The beauty of it is that your main machine remains unburdened while your cluster does all the hard work.



Do you have the right protection?



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FRACTALS

Delve into chaos with Excel

Mike Bedford creates a chaotic system on your PC and uses it to draw an intriguing bifurcation diagram.

WHAT YOU'LL NEED

MICROSOFT EXCEL

You'll learn far more about fractals through Excel than you will by using any dedicated fractal software. You'll also need the files Chaos-1.xls, Chaos-2.xls, Chaos-3.xls and Chaos-4.xls. You will find these workbooks at *www.apcmag.com/fractals.htm*.

There's a phrase that states: a butterfly flapping its wings on the slopes of Mount Fuji could, in the fullness of time, create a hurricane in the Caribbean. This is because weather is one of those systems that mathematicians call chaotic, which is why long-range forecasting is so problematic. Here, we're going to use Excel to understand what mathematicians mean when they talk about chaotic systems before generating a bifurcation diagram, which can be thought of as a picture of chaos. We'll also investigate the links between chaos theory and the world of fractals that we looked at last issue (page 98).

INVESTIGATING CHAOS

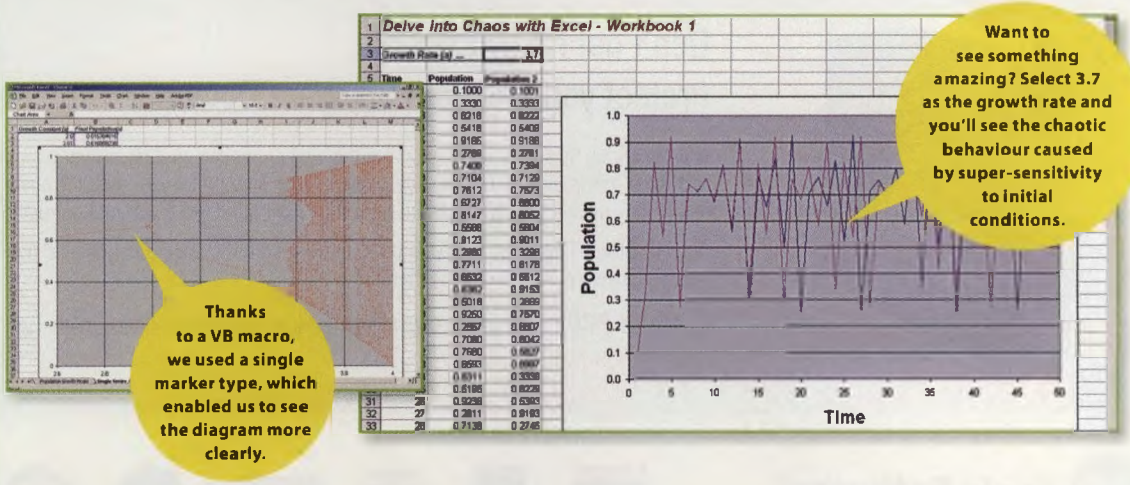
The following equation was once proposed as a model for the growth of the population of a simple species such as the fruit fly. It's written as: $x_{n+1} = a\,x_n\,(1-x_n)$. x_n is the population in the current generation, x_n+1 is the population in the next generation and a is a growth rate. The $(1-x_n)$ term takes into account the fact that there's a maximum population that the environment can support. The population in this model is what mathematicians refer to as 'normalised to 1', so if the actual maximum population is 1,000,000 then all of the values would be multiplied by a million. This is an over-simplified model, but it does provide us with a starting point for our investigation of chaos theory.

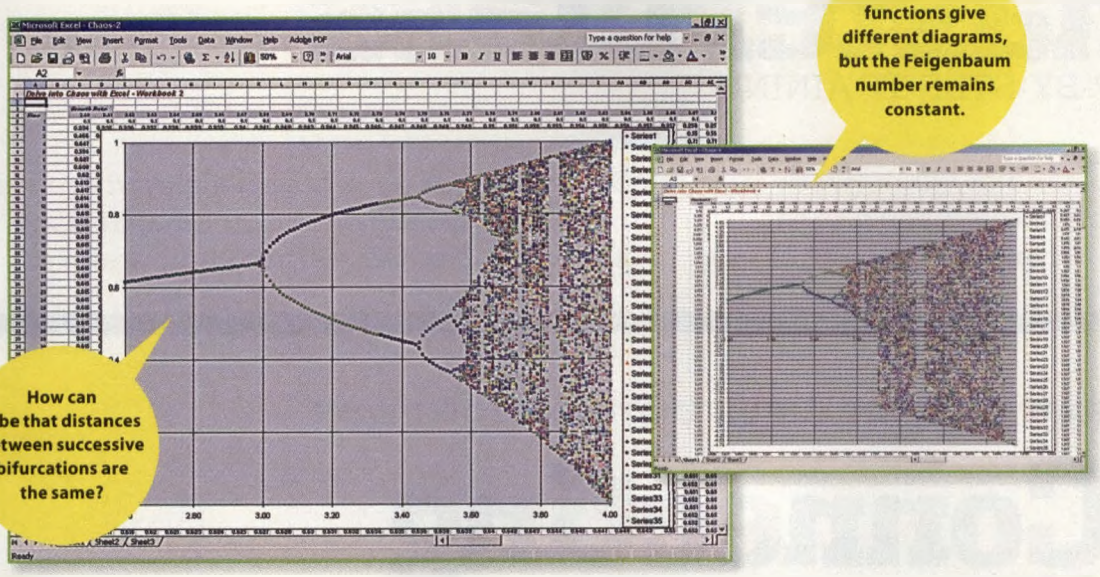
First, open the Excel workbook entitled 'Chaos-1', which you'll find online at **www.apcmag.com/fractals.htm**. You'll see that the growth rate, which is found in cell C3, is set to 2, and that the graph of population against time shows a rapid growth to 0.5, at which point it remains constant. Try growth rates of 2.5 and 2.7 and you'll see the same sort of behaviour, but with a higher final population and, in the case of 2.7, some fluctuations to start with.

Now try a growth rate of 3.1 and you'll see something quite different. Instead of a single final value, the population alternates between a pair of values. This is explained in terms of a 'boom and bust' scenario, in which alternate generations find that they are competing for resources and, hence, their population declines. Next try a growth rate of 3.5 and you'll discover even more complicated behaviour: now the population alternates between four different values. If you play a bit more, you might also find growth rates that produce eight, 16 or 32 different values of the final population. To see something amazing, select 3.7 as the growth rate. You'll immediately see two things that are different from the situation with other growth rates: the population thrashes around randomly and there are two visible traces (with all previous growth rates the two traces were identical, so you only saw one). In fact, the two traces — which are for the populations in columns B and C — represent two different populations that differ only in their starting value. Try changing C6 to 1.10001 or even 0.100001 and you'll see that although the two traces follow each other for a longer amount of time, they eventually diverge. What we're seeing here is a chaotic system: that is, one that exhibits super-sensitivity to the initial conditions in which it was created. Any difference at all, however tiny, will cause the final outcome to be totally different.

THE BIFURCATION PLOT

We've seen that as the value of the growth constant 'a' increases, the final population first increases, then


Delve into Chaos with Excel - Workbook 1
Population
Time
Want to see something amazing? Select 3.7 as the growth rate and you'll see the chaotic behaviour caused by super-sensitivity to initial conditions.
Thanks to a VB macro, we used a single marker type, which enabled us to see the diagram more clearly.


Different functions give different diagrams, but the Feigenbaum number remains constant.
How can it be that distances between successive bifurcations are the same?

A BIFURCATION DIAGRAM CAN BE THOUGHT OF AS A PICTURE OF CHAOS

alternates between two values, then between a larger number of different values and eventually, as chaos sets in, varies randomly. So it might be interesting to draw a graph that shows how the final population(s) varies with the value of the growth rate. To see this diagram, open the workbook 'Chaos-2'.

In columns C through to EM we have population figures just like those in Chaos-1, but for a single initial population value of 0.1. It also includes a whole range of growth rates, as indicated in cells C4 to EM4, ranging from 2.6 to 4.0 in steps of 0.01. If you select the chart, click on the Chart Wizard and step through, you'll see that the chart is an XY plot and the population values plotted are only those from row 154 onwards. This is to exclude the early population values so that the only values to be plotted are those after the population has settled down to its final value(s). Looking at the plot, you'll be able to see the gradual increase with increasing growth rate, the bifurcation to two alternating values at a value for the growth rate of 3, further bifurcations at about 3.45 and 3.55 and chaos setting in at about 3.58. You'll also notice that a period of non-chaotic behaviour returns briefly at about 3.82, and that although there are hints of more structure, it's hard to see much more with Excel's default marker types. To fix this, we need to make the markers look the same and decrease their size. It would be a very laborious process to change these by hand, however, there is another way to do this, as you'll see if you open up the workbook 'Chaos-3'.

The 'Population Growth Model' worksheet is much like the one we saw in Chaos-2, but there's a button labelled 'Reorder data' at the top. You'll only need to press this button if you make any changes in the first worksheet. The button executes a macro that copies all of the data to the second worksheet, 'Single Series'.

When the data is copied, it's arranged so that it's all in a couple of columns, with values of the growth constant in column A and the final population value(s) in column B. This means that the data can be plotted as a single series, making it simple to make the markers small and plain. The graph is similar to the one we saw in Chaos-2, but it's easier to see the detail and, if you change the scale of the X-axis, you'll be able to see yet more detail for a smaller range of values. Now you'll be able to see that there are a number of areas of ordered behaviour inside the chaotic region, and in each case this order breaks down by multiple bifurcations, eventually leading to a return to chaos.

RANDOM ORDER

Next, we'll examine an entirely different equation given by the formula $x_n+1 = k \sin(x_n)$ where k is a constant just as a was in our previous equation. It's easy to modify Chaos-2 to use this formula. If you do this, use values of 1.4 to 4.75 for k and change the vertical axis of the graph to have a range of -4.75 to +4.75. If you would prefer to use a ready-made workbook, just open 'Chaos-4'.

The graph in Chaos-4 has some obvious similarities to our previous bifurcation diagram, even though the two diagrams were generated using totally different formulae. However, the two systems have more than a visual similarity in common.

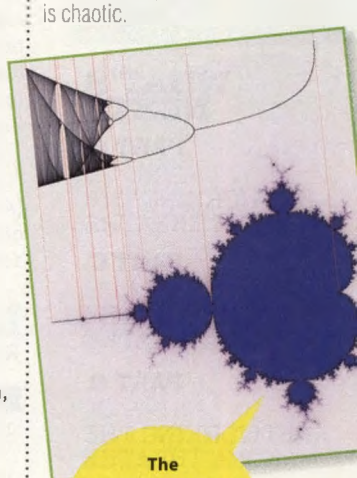
In our model of population growth, the first few bifurcations occur at growth rates of 3, 3.449, 3.544 and 3.564. In fact, if you accurately measure the distances between successive bifurcations (3.449-3, 3.544-3.449, 3.5644-3.5441 and so on) you'll find that the ratio is a constant value of about 4.7. But the really amazing thing is that if you do the same with our second bifurcation diagram, you'll find exactly the same ratio again. This number is known as the Feigenbaum constant, and it's identical for all systems that show period doubling leading to chaos.

The question of whether God is a mathematician has often been posed; sometimes tongue-in-cheek, sometimes more seriously.

Some may speculate that the fact that such amazing coincidences crop up in mathematics with such regularity suggests that the answer might just be yes. ATC

MORE ABOUT... FRACTALS AND CHAOS

Last issue we generated the Mandelbrot Set, and this issue we're generating a bifurcation diagram, but bizarrely there's a connection between them. We're just scratching the surface of the tie-up between fractals and chaos theory. Another link is that each period doubling is a smaller version of the previous period doubling. In maths jargon, it's therefore self-similar at all levels of magnification, meaning that the diagram is itself a fractal figure. Consider too that two points on the complex plain that differ by only the smallest amount might not both be in the Mandelbrot Set. And as we saw last issue, this means that they'll behave in a radically different way when subjected to multiple iterations of a simple formula. This super-sensitivity to initial conditions means that the Mandelbrot operation is chaotic.



IN THIS SERIES

Learn how to network every digital device in your home, everywhere from the home theatre to the bedroom. This is the ultimate home-networking tutorial on how to turn your castle into a 21st-Century digital paradise.

APC EXPERT

THE CONNECTED GUY

David Neiger will be building the connected house in a real home and will be filing regular columns and updating the *APC* web site as he goes along. David is a qualified engineer with many years of networking, IT implementation, consulting and project management experience.

WHAT'S NEXT?

PART 4
APRIL '09
NETWORKING THE HOME THEATRE

PART 5
MAY '09
NETWORKING THE HOME THEATRE

PART 6
JUNE '09
NETWORKING THE HOME THEATRE

PART 3 CREATE THE ULTIMATE CONNECTED HOME

Connecting the study

Now that we have our internet and cable infrastructure, the next part of the Connected Home project is to connect up the study.

In our study we have two PC notebooks (one running Vista Ultimate and the older one running Windows XP), an Apple iMac, an HP P1005 personal laser printer and a networked HP Officejet Pro L7590.

It is possible just to connect them all up and allow DHCP (automatic allocation of IP addresses) to take care of everything, however, this is not the best option for a complex network such as the one we are building. The reason is that DHCP assigns dynamic IP addresses to each device, which means that it is likely that your printers and media devices will move address. The devices would then need to rely upon Netbios broadcasts to locate them again. It is analogous to having to run down the street yelling out for the Smiths rather than knowing that they live at number 23 and have lived there all their lives.

So back to the "P" word again: planning!

If you set up your router as we discussed in Part One (*APC* January, page 94) you would have created an internal network with 253 private IP addresses. Private IP addresses are internal IP addresses that can be accessed by devices on your internal network but are hard to reach from the internet. They allow you to share an internet connection and connect many devices to the internet through the one address. You can think of private IP addresses as a closed community, such as dorms or an office. Everyone inside the community can easily get to each other but those on the outside need to be let in and directed by the gatekeeper (which is our firewall router). If you're addressing an envelope to the closed community you simply put the name and outside address and let the internal mail room work out which physical address to deliver the envelope to. As you can appreciate, giving physical addresses to every worker or every person in every community would completely paralyse the mail system; likewise with the internet. It is not physically possible to have every internet enabled device connected with its own public (visible) IP address as there are just not enough IP addresses available. This will change with IPV6, but at this stage we are stuck with the limited number of IP addresses available with the current IPV4 TCP/IP protocols.

LEFT TO YOUR OWN DEVICES

RECORD ALL THE DEVICES WITHIN YOUR NETWORK

IP ADDRESS	NETBIOS NAME	DEVICE	RESOURCES	LOCATION
192.168.1.254	Gateway	Internet router	Provides internet connectivity to network	In study next to phone socket
192.168.1.1-192.168.1.49	Poor (paused every 3 secs)	PCs, notebooks and netbooks	Computers connected to our network	See diagram
192.168.1.50	Laser	Mono laser printer	Network shared laser printer	Upstairs on Jill's desk
192.168.1.60	HomeNAS	NAS storage	File storage and backup	In study, in server cupboard
192.168.1.70	TVServe1	HD media streaming device	Distributes high-def video content	In study, in server cupboard
192.168.1.71	Music1	Audio streaming device	Distributes music files	In A/V cabinet in lounge room

Missed a tutorial?
Visit www.magshop.com.au for back issues of APC

Like in our community, there are certain services that you want to have available at all time at the same physical address. Imagine if the office toilets or canteen kept on being relocated every few hours!

We will call these devices fixed resources, and they include such things as printers, storage devices, media servers and of course the Internet Gateway. Other devices, which we will call dynamic devices, mainly use resources such as notebook computers, netbooks and wireless devices. These can be allocated the dynamic IP addresses.

It is difficult to keep track of all your network resources in your head, particularly as the network grows in complexity, so it is a good idea to develop a network address allocation plan. This allows you to track all of your network resources which makes it easier when you need to connect and find other devices on your network.

Of the available private IP addresses, 192.168.x.0 and 192.168.x.255 are used for the network and broadcast addresses respectively. They cannot be used for devices. Your internet gateway (the modem/router) also needs an IP address. In our example it is assigned 192.168.1.254.

You then need to allocate some IP addresses for dynamic devices (notebooks, netbooks etc.). Make sure you allocate enough IP addresses for all your dynamic devices and a few extra for smartphones, internet radios and, no doubt, future versions of iPods which also need IP addresses. Now allocate some IP addresses for your fixed resources. I recommend allocating 10 IP addresses for each type of device as this makes it easy to identify devices on the network. For example, you might allocate addresses 192.168.1.50-192.168.1.59 for printers (so you know devices with IP addresses in the 50s are printers).

Create a table in your word processor with five headings: IP address, Netbios name, device, resources and location. Use this table to record all of the devices on your network so that you can easily locate them again. Below is an example table for our connected study.

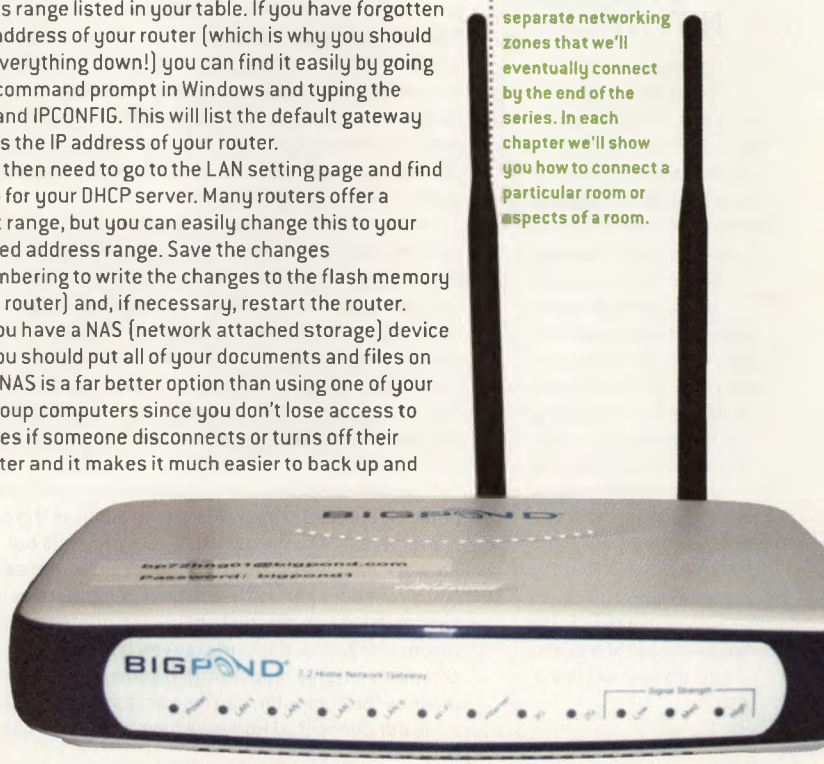
The next step is to log into the router to ensure that the DHCP server only allocates IP addresses within the address range listed in your table. If you have forgotten the IP address of your router (which is why you should write everything down!) you can find it easily by going to the command prompt in Windows and typing the command IPCONFIG. This will list the default gateway which is the IP address of your router.

You then need to go to the LAN setting page and find the tab for your DHCP server. Many routers offer a default range, but you can easily change this to your allocated address range. Save the changes (remembering to write the changes to the flash memory of your router) and, if necessary, restart the router.

If you have a NAS (network attached storage) device then you should put all of your documents and files on that. A NAS is a far better option than using one of your workgroup computers since you don't lose access to your files if someone disconnects or turns off their computer and it makes it much easier to back up and

THE NETWORK ZONES

We will break down our house into separate networking zones that we'll eventually connect by the end of the series. In each chapter we'll show you how to connect a particular room or aspects of a room.



Sharing your printer is easy if it's already network-enabled.
Add Printer
Searching for available printers...
Stop
The printer that I want isn't
To enable sharing for your printer, click 'Share this printer'.
Make sure File and Printer Sharing for Microsoft Windows is enabled.

MORE ABOUT PRINTER NETWORKS

When you install an HP Officejet Pro L7500, the setup disk includes options for configuring the network. By default, the printer will use an automatic IP address (which will be allocated from your dynamic IP address range) and broadcast a default Netbios name. Although this should work, we have found that in some cases Vista and particularly XP will not find the printer particularly if you have a firewall or router between your computer and the printer. If, however, you configure the printer with a fixed IP address, it will be easier to manage, since you can simply specify the printer address if the printer wizard does not find it.

manage your files if they are all in the one location. If you don't have a NAS or file server you will need to allocate one of your computers to be the central repository of files. Allocate the NAS an IP address and give it a meaningful Netbios name (such as HomeNAS or FileStorage). You will need to set up shares on your NAS and allocate usernames and passwords. Most NAS devices can be configured by a web interface, so this is fairly straightforward. I recommend changing the default admin account (if possible) and definitely change the default password so other users on your network cannot accidentally modify settings.

Once the NAS is connected you should be able to connect to it from Network (or My Network Places) by browsing your computers. If you cannot see the NAS, check to see that it is connected by going to the command prompt and pinging the IP address (in our example, type 'ping 192.168.1.60'). If the device responds to ping requests, the physical connection is fine, which means that you may have not given the NAS the same workgroup name as the other computers on your network.

The next step is to share your printer. If you have a network-enabled printer this is very easy, as the print server is built into the device. If your printer is not network-enabled you either need to buy a print server (recommended) or use one of your computers as a print server. Using a computer to share the printer is not recommended for the same reason (that you don't use a computer as a file repository). If someone turns off or crashes the computer, you lose access to the resource.

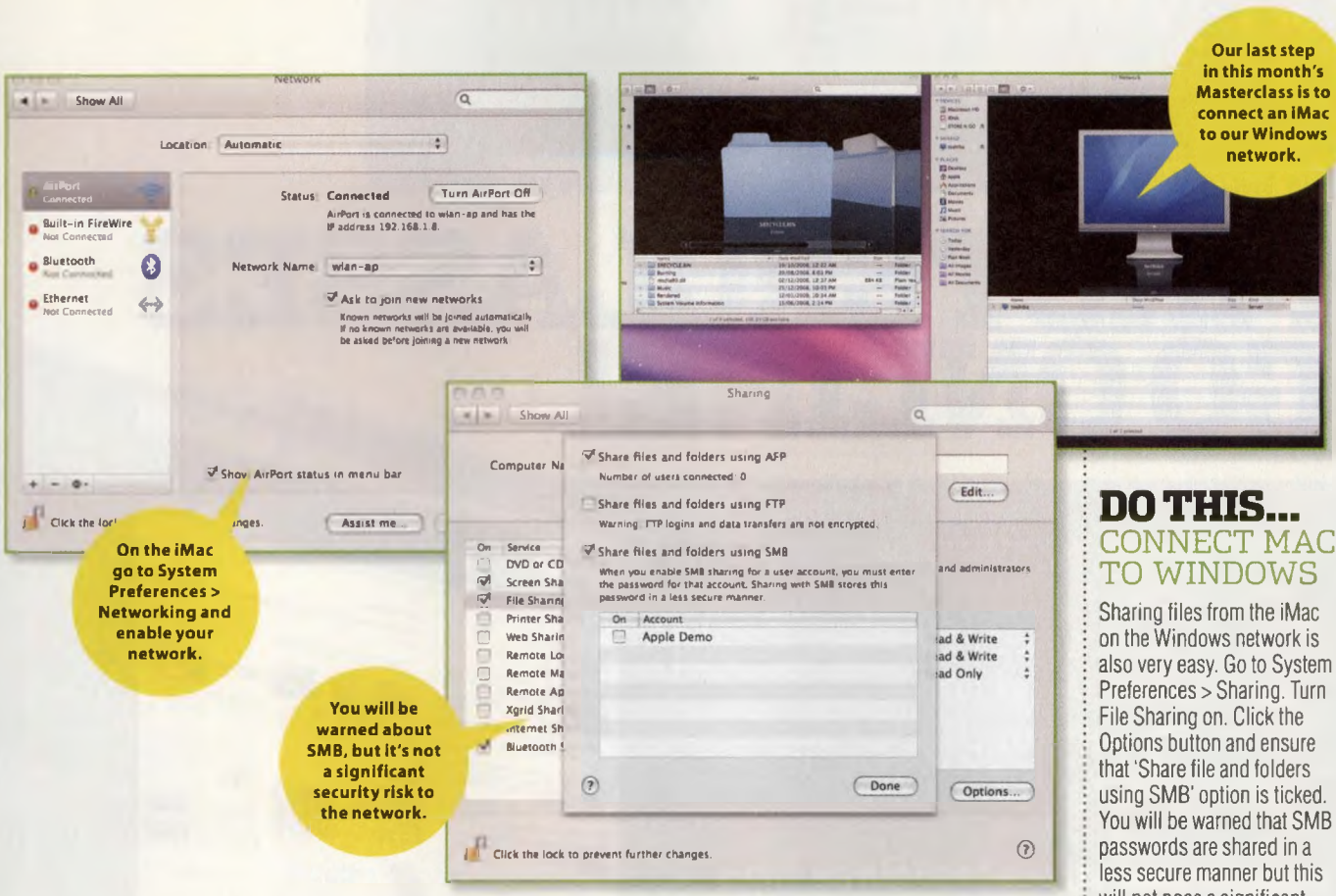
In our Connected Home we have a small HP Laserjet P1005 connected to an old Dell XP laptop via USB. To share the printer, go to Start > Control Panel Network Connections. Right-click on the network device and choose Properties. Make sure File and Printer Sharing for Microsoft Windows is enabled.

Under Vista, go to Control Panel > Network and Sharing Center and make sure Printer Sharing is enabled.

Now go to the printer and select the printer you want to share. Right-click on the printer and choose Sharing. Choose Share this Printer and type in a meaningful printer name. Other computers can then connect to this printer over the Windows Network and the drivers should be automatically installed. In some cases, you may still need to install printer drivers on each individual machine, particularly for multifunction devices like our Officejet Pro L7500. You can download the latest drivers from the printer vendor's web site (which are generally more up to date than the driver CD included with the printer).

Connecting a network printer is much easier, particularly since most install programs guide you through the necessary steps. Whilst you can simply run the install program and let it configure the printer for you, this may not be the best option, since some companies like to bundle extra software, which you probably don't want. A cleaner install (particular on machines that already have several printers attached) is to download the basic driver from the web and install the printer yourself.

Most printers now come with a web interface, which we will use to configure and manage our printer. Open up your browser and type in the Netbios name or IP address for the printer. You can find the Netbios name and IP


Our last step in this month's Masterclass is to connect an iMac to our Windows network.
On the iMac go to System Preferences > Networking and enable your network.
You will be warned about SMB, but it's not a significant security risk to the network.
Network
Show All
Location: Automatic
Status: Connected
Turn AirPort Off
Network Name: wlan-ap
Ask to join new networks
Sharing
Share files and folders using AFP
Share files and folders using FTP
Share files and folders using SMB
Apple Demo
Edit...
Done
Options...
Click the lock to prevent further changes.

address by printing the configuration page. Note that many consumer printers do not provide any password security, which allows anyone to log into the printer and change settings, so be careful.

Choose the networking tab for your printer. From this page you will be able to change the Netbios name to something more meaningful if you want and also allocate a fixed IP address for the printer. When asked for the subnet mask, enter 255.255.255.0 and the IP address of the router for the default gateway. Click apply and then enter the new IP address for the printer in your browser if you want to continue to configure the printer. If you change the IP address of the printer you may need to reconnect to it from Windows.

To install the printer on another machine you can run the install disk or simply take your downloaded driver and browse for the printer. If your computer does not find the driver then simply specify the IP address for the printer and install the downloaded driver. Then you can print to your printer from any machine on the network.

The last thing we will do in our Connected Home is to connect an iMac to our Windows network. To do this, we will need to enable networking on the iMac, specify the network name and, if the iMac does not find the Windows computers, manually connect to the Windows shares.

On the iMac go to System Preferences > Networking and enable your network. Since we have a wireless network in the Connected Home, we chose to enable the AirPort. The DHCP server automatically allocates an IP address and DNS details. To verify that the iMac is connected, open up Safari and check that you can browse the internet.

The next step is to choose the Advanced options and specify the WINS details for your workgroup. Click OK and, if necessary, apply to connect to the Windows workgroup. In many cases the iMac will automatically find the Windows shares and allow you to connect to the Windows network directly from Finder. However, if the iMac does not find the Windows machines, simply choose Go > Connect to Server and enter the name of the Windows machine you want to connect to. Remember to enter the full URL of the Windows machine with SMB (ie. smb://toshiba). You will be prompted to enter the username and password and have the option to add it to your keychain so you don't have to keep re-entering it.

Even though we have connected up the study, there are other things still to do. It's great to have all of your data readily accessible, but it is important to develop strategies for backing it up. Unfortunately, all hard disks (mechanical or solid state) will eventually fail, and if you don't have a backup, all of your data will be lost. It is also wise to keep a copy of the data off-site in the event of fire or burglary.

If you have a notebook computer or work in several places, it is handy to be able to take your data with you. Whilst Microsoft offers offline folders, these only work if you have a Windows 2000 (or later) server, and in our experience they don't work as well as you would like. We will look at more efficient ways for taking your data with you, including being able to synchronise data to memory keys and removable hard drives.

We will also look at connecting up a VoIP phone to save money on telephone calls — and ways of sharing USB devices such as scanners.

DO THIS...
CONNECT MAC TO WINDOWS

Sharing files from the iMac on the Windows network is also very easy. Go to System Preferences > Sharing. Turn File Sharing on. Click the Options button and ensure that 'Share file and folders using SMB' option is ticked. You will be warned that SMB passwords are shared in a less secure manner but this will not pose a significant security risk to the network. By default, only the Drop Box folder is shared. If you want to share other parts of your hard disk you need to add them to the shared folder list and set access permissions. Make sure that the usernames on the iMac are exactly the same as the usernames and passwords on your Windows machines otherwise sharing will not work properly. To connect to the iMac from the Windows machines, simply browse the network and the iMac with its shares will be visible.

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Without the space restrictions of this month's print magazine, they will run longer and be available with previous chapters.

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BLACKBERRY BOLD: IPHONE KILLER?
CONSTANTLY UPDATED BEST PHONE PLANS

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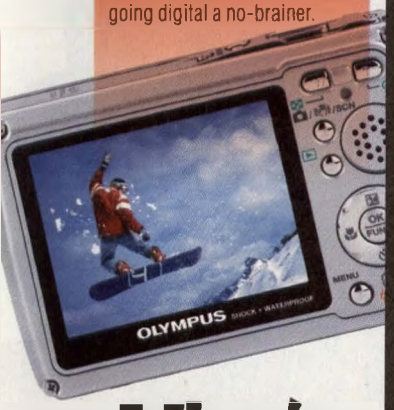
DIGITAL CAMERAS

The versatility and simplicity of never having to change film, never having to pay for printing of crap pictures and never having to buy new batteries (in most cases) made going digital a no-brainer.



What's hot & not

TECHNOLOGY THERMOMETER

35MM FILM CAMERAS

This once prolific format has seen sales drop by 75% since it peaked in 1999. The advent of digital cameras has caused users to realise they needn't limit themselves to a maximum of 36 pictures on a roll of film when they can go digital and take thousands of higher-quality photos with no ongoing costs.

DOWNTIME REVIEW

EcoButton

Finally, an idiot-proof means of saving electricity while your computer is not in use! Why didn't anyone else think of this?

It is believed that Australians waste $235,000,000 worth of electricity each year on leaving their computers running unnecessarily. That adds up to 800,000 tonnes of CO2, which we can all agree is a massive amount.

A new gadget on the market is set to combat this trend with the ability to put your PC (or notebook) into a deeper energy saving mode than your PC's usual standby mode with the push of a single button.

The EcoButton works by turning off all the components inside your system except the essential memory. When in use, the EcoButton will run your system using as little as 1.8 watts of electricity. (Which is drastically lower than your standard sleep/standby modes.)

The EcoButton is illuminated and sits on your desktop next to your keyboard and acting as a strong visual reminder for you to save electricity each time your computer is going to be left idle. It connects to your computer via a USB cable.

Each time you take a break, make a phone call, go for a meeting etc., all you have to do is press the EcoButton and your computer is put into energy-saving 'ecomode', which ensures that both your computer and monitor draw only the same nominal power as when they are shut down. To restart, all you need to do is press any key on your keyboard and your computer instantly returns to where you left off.

Built-in software keeps tabs on how often you use the device to create a record of how many carbon units and how much power and money you have saved by using the EcoButton. This makes for a graphic representation that demonstrates how much you can save. 130kg of CO2 and $50.00 in electricity is the expected average saving per year. Australia-wide that could stop approximately two million tonnes of CO2 from passing into the atmosphere through computers otherwise being left running idle at home.

We're not alone in believing that this is a great idea. The EcoButton has won the 'Most Innovative Green Product' Award at the 2008 ASI Show in the USA, as well as the British Promotional Merchandise Association Award 2008 for 'Most Innovative Green Product'. At only $24.95, this is a must-have product for every home or office that will eventually pay for itself. . . and then some.

Christopher Zammit

five
HI-POWER @ PLAY

01 EVERKI CLICK CAMERA POUCH

Damn those shiny, brushed metal surfaced digital cameras! They look great when they're new but they quickly end up looking scuffed after you've used them a few times. (Or is that just me?) To avoid this, the Everki Click camera pouch is a durable way of protecting your digital compact. Made from a tough and thick Neoprene fabric that also keeps the heat out, you will never have to worry about scratches on your LCD again. A simple zipper along the length of the body allows easy access, while a large carrying clip makes it possible to keep your camera handy without filling up your pockets.

Christopher Zammit

CONTACT	Everki
ONLINE	www.everki.com
PRICE	$14.99

02 LEAPFROG LEAPSTER 2

Here at *APC* we love anything that's going to get kids interested in tech at a young age. This robustly made gaming device offers a range of learning experiences for kids through built-in tutorials and levels that adapt automatically to your child's pace. Its LCD touchscreen and stylus help develop motor skills used in writing, while developing basic computing skills. With over 30 'games' covering every subject from maths to reading, the Leapster can also be connected online so parents can monitor their child's progress. If only they had these when I was a kid.

Karen Holland

CONTACT	Leapfrog
ONLINE	www.leapfrog.com
PRICE	$129.95

03 NOKIA BH-904 BT HEADSET

The BH-904 from Nokia is a headset that has been designed to separate the user's voice from surrounding ambient sounds. This makes for improved voice quality in crowded or noisy environments. Multi-point technology utilises two microphones, allowing the BH-904 to connect to two different devices simultaneously. With a rated talk time of eight hours and up to 160 hours in standby mode, the BH-904 will only need the occasional recharge. A charge time of 15 minutes means that you are never without it for long. Now if they could just make them less conspicuous...

Christopher Zammit

CONTACT	Nokia
ONLINE	www.nokia.com.au
PRICE	$99.99

04 KATA 3N1-10 SLING BACKPACK

Aimed at the roving camera enthusiast, the 3N1-10 sling backpack is a structurally protected bag which can carry a DSLR with a mid-range zoom lens attached, 1-2 spare lenses, flash and personal gear. This unique bag allows for three carrying options in one while easily morphing from sling to backpack and back again by use of its quick release buckles. Modular dividers allow users to custom fit the bag to their exact equipment. The large top compartment is designed to hold additional gear, with an internal pocket and mp3 pouch. Plus it has a rain cover to keep everything dry. Nice.

Karen Holland

CONTACT	KATA
ONLINE	www.kata.com
PRICE	$182

05

06

07

08

RESIDENT EVIL DEGENERATION

05

Zombies are cool! With no Milla Jovovich in sight, Resident Evil turns CGI with the latest addition to this game-based franchise. Degeneration sees a zombie virus unleashed on a packed airport as the hero of the original film just co-incidently happens to be present. Hmmm. With action that is as good as any live action film, and a strong manga feel, Degeneration is surprisingly watchable. With all the blood, guts and moaning you've come to expect from a zombie movie, Degeneration delivers the goods. It's just a shame that weak facial animation makes the film look like one giant cut-scene.

Christopher Zammit

CONTACT	Sony Pictures
ONLINE	www.sonypictures.com
PRICE	$39.95 (Blu-ray)

WALL-E BLU-RAY DISC

06

The story of a waste allocation robot that was left behind on Earth 600 years after the planet was abandoned, Wall-E is an almost depressing hard-core sci-fi film which predicts a dark future for the human race. The fact that the first hour of the film has not one single word of dialogue is testamount that PIXAR has made Wall-E with adult viewers in mind rather than kids. Stunningly created CGI visuals paired with a truly interesting storyline makes this a very grown-up experience. That's not to say that there isn't anything here for the kids. Wall-E is an amazing film truly for everybody.

Christopher Zammit

CONTACT	Disney/PIXAR
ONLINE	www.disneydvd.com.au
PRICE	$39.95 (Blu-ray)

MOPODS

07

Simply attach the MoPod to your bag, keys or clothing and the figurine inside will spin and flash lights to alert you to incoming texts and calls. So no more missed calls from friends! This comes in handy if your phone is on silent or you're in a noisy environment that makes hearing your ringtone impossible. There are five funky characters available: Kitten, i-Penguin, Puppy, Monkey and Devil. (All of which have their own features.) It is compatible with all GSM networks and it operates on two LR44 button batteries. This gizmo is sure to lighten anyones mood.

Helen Chen

CONTACT	MDI
ONLINE	www.mdiaus.com.au
PRICE	$14.95

VISIMAX LED PROJECTOR

08

Visimax is a lightweight LED projector that is similar in size to most compact cameras. Aimed at providing users with the portability and freedom of quickly and simply being able to project images or videos between most portable devices onto any flat surface, the Visimax gives good results for such a compact unit even though the image quality is nowhere near HD (640x480 pixels). Its portability only comes into question when you realise that the power pack is bigger than the device itself. With a simple plug and play setup, the Visimax plugs straight in to most devices with a single connection.

Christopher Zammit

CONTACT	Maxon
ONLINE	www.maxon.com.au
PRICE	$599

Quikfix
New release

LOCOROCO 2
The sequel to Sony's 2006 PSP exclusive, LocoRoco 2 is a 2D platformer in which players roll, jump, squish and (above all) sing their way to a peaceful existence against the deadly threat of the Moja Troop. While all this sounds sinister enough, fear not, LocoRoco 2 is as cute as a button on the frock of a fluffy bunny. It's available now for the PSP for just under $50.

FABLE 2: KNOTHOLE ISLAND
Knothole Island adds a new area (a mysterious island off the coast of Albion) including new quests, weapons, desperate friends and needy family members. Available for download from XBOX Live now for 800 points, it's time to brush the dust off this classic title, head out for some adventuring and discover — and probably slaughter — the local wildlife.

Animal Crossing: Let's go to the City

Peter Dockrill sets out for a seachange.

Animal Crossing, or Is It The Sims for kids? You decide...

If there's a current title on the market that perfectly symbolises the cutesy stereotype that Nintendo carries, it's Animal Crossing. The series, which previously appeared in Gamecube and DS instalments, has now made its way to the Wii, and it's as cute as ever (and divisively so). Having said that, there's something truly beguiling about the Animal Crossing concept: move to a town of cuddly, little cartoon critters and while your time away amongst them, making friends, planting gardens, playing games, working jobs, writing letters etc. And that's pretty much it. It's like a perfectly realised fantasy world; one where you never have to grow up, free of any kind of grittiness, danger or seriousness.

The only thing is: it's not to everyone's taste. While some will relish the opportunity to, as Nintendo puts it, "Escape to a world of endless possibilities" and find the experience addictive and fulfilling, others will discover their new wrapped-in-cotton-wool life pursuits to be banal and repetitive. Let's Go to the City doesn't mess with the core AC formula too much: the new City environment enables you to get outside of your town and mix it up in the big (actually pretty little) smoke, and the Wii Speak microphone peripheral lets you speak online with friends. Ultimately, however, Animal Crossing may well be a nice place to visit, but we wouldn't want to live there...

AVAILABLE PLATFORMS	
PC-DVD	**Wii**
PS3	PSP
XBOX 360	NINTENDO DS
CONTACT	Nintendo
ONLINE	www.nintendo.com.au
PRICE	$99.95
✔	Immersive, peaceful and pleasant for those interested.
✖	Definitely not for everyone; not much new in this Wii version.
VERDICT	★★★☆☆

WoW: Wrath of the Lich King

Nick Race buckles on his sword and leaps once more into the fray.

If you've drifted from WoW, here's Blizzard's latest attempt to pull you back in...

For those die-hard World of Warcraft players, this review isn't for you. This is for those who, like me, gave up a while back and are still sitting on the fence about whether to jump back in. For those who have stayed away, WotLK takes place in a northern continent, Northrend, home to the Lich King, a perverted incarnation of Arthas Menethil. Arthas corrupted his crusade to the northern reaches and created the Death Knights; unholy warriors fighting for the Scourge. Some of the Death Knights broke away from the Lich King's power, joining both the Alliance and Horde as playable character classes; and they're heaps of fun. Death Knights play like a warrior with some self-healing and AOE abilities, and new DK characters start at level 55 avoiding another long grind to the new level cap of 80.

Wrath of the Lich King is what the Burning Crusade wished it could be. Endless rep grinds have been replaced with a smart reputation system, allowing you to earn reputation for whichever faction you fancy in any dungeon by wearing that faction's tabard. No more doing the same dungeon over and over again. The dungeon difficulty has been notched down; however, Heroic versions of each dungeon exist, upping the challenge and the reward. The low-end raid Karazhan has been replaced by a reworked Naxxramas from the original WoW, and like the other entry-level raids can be completed with either 10 or 25 players.

It's definitely more fun than the Burning Crusade, with a deeper plot, more interesting locations and a less steep dungeon and raid curve. If you're an ex-WoW player, then give it a shot. I'm glad I did.

AVAILABLE PLATFORMS	
PC-DVD	Wii
PS3	PSP
XBOX 360	NINTENDO DS
CONTACT	Blizzard
ONLINE	www.worldofwarcraft.com
PRICE	$55.95 plus subscription
✔	Less grind; more forgiving; more content for casuals.
✖	You'll get sucked in again.
VERDICT	★★★★☆

Toprate

You've gotta try...

CALL OF DUTY: WORLD AT WAR

The Call of Duty franchise can be split into two categories based on the series developers. The life-changingly brilliant Infinity Ward CoD, and the average FPS Treyarch CoD. As if it hasn't been covered already, Treyarch's World at War thrusts players, once again, into World War II, and more specifically the Pacific and Eastern (Russian) fronts. While the gameplay throughout the single player campaign is decent, it's just more of the same thing we've already seen a dozen times over. Co-op for up to four players has been (finally) added and is a welcome addition to the series. Online multiplayer has always been the strongest pull for the series, and as always, the unrelenting frag-fest is a hell of a lot of fun. . . (it's just nothing new).

Gears of War 2

Troy Coleman is welcomed into Delta: wonders what the hazing might be.

The sequel to EPIC's epic 2006 third-person shooter, Gears of War 2 (GoW2) thrusts players back into the role of Delta Squad's Marcus Fenix in his — and humanity's — struggle against the Locust. The core gameplay remains unchanged from the first. Armed with the trusty Lancer — basically an assault rifle with a chainsaw bayonet and THE weapon to use from beginning to end — and an assortment of 'the usual' shooter weapons and explody things, progress through the game involves running between plentiful cover and shooting at anything that shoots at you. Finding and using cover to fire from is as paramount to success as ever, and allowing players to use injured enemies as meat shields is cool, but the reality of it is that it's far less efficient to get up close and personal for pick up than to zing off a couple more rounds from your already covered position. Fans of the series will more than likely be disappointed with the storyline, as all unanswered plot threads remain not only unanswered but frayed even further. But since the series was slated for a trilogy from the get-go, hopefully everything will wrap up nicely next time around. As well as the standard online multiplayer archetypes, a new cooperative mode named Horde is available and pits players against wave after wave of Locust in a non-stop slaughter-fest. A great addition to any games library, GoW2 is one for old or new fans.

AVAILABLE PLATFORMS: PC-DVD, Wii, PS3, PS2, XBOX 360, DS

CONTACT Microsoft
ONLINE gearsofwar.xbox.com
PRICE $99.95

✔ Fantastic third-person action; Horde co-op.

✖ Super-anti-climactic; companion AI sometimes docile.

VERDICT ★★★★★

AVAILABLE PLATFORMS: PC-DVD, PS3, PS2, XBOX 360, DS

CONTACT EA Games
ONLINE www.redalert3.com
PRICE $99.95

✔ Fun for those seeking to create a new world order.

✖ Nothing really new here.

VERDICT ★★★☆☆

Command & Conquer: Red Alert 3

Josh Pike wonders what would Rommel do?

The latest title in the Red Alert series opens with the Soviets travelling back in time to assassinate Einstein; thus causing the emergence of a new superpower in the present, the Empire of the Rising Sun. This brings the tally of playable factions to three: the Soviets, the Allies and the Empire.

I must admit that I have not played any C&C title since the original game came out on the Sega Saturn in the mid '90s. So I was a little surprised that, despite obvious improvements in graphics, not much has really changed from all those years ago. The biggest differences come in the form of online play, and the presence of a co-commander to assist you with their forces on the battlefield.

I was immediately engrossed by this game, with its attack dolphins, infantry bears and telekinetic schoolgirls. There is a vast array of war machinery and each unit type has multiple abilities, so it's possible to use a myriad of tactics.

However, the further I progressed, the more I wanted it to be a bigger, more diverse experience. This game sticks to what it knows best, keeping its tongue in cheek with excellent cut scenes of B-grade actors (ie. Tim Curry) hamming it up, and the appeal of building gargantuan forces to completely overwhelm and annihilate the enemy.

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chipchat

BY PETER DOCKRILL

Two wrongs don't make a right?

Malware: it's not the kind of thing that you'd figure would have much of a social conscience, is it? After all, 'malicious software' just sounds, well... nasty. And when was the last time you heard about a virus that did something nice for somebody? Well, it turns out appearances can be deceiving, and maybe we've been misjudging poor old malware all these years. As reported on TorrentFreak.com, a trojan horse recently appeared on numerous BitTorrent sites, which, after infiltrating a user's PC, blocks their access to the popular Torrent sites The Pirate Bay and Mininova and informs them that "Downloading is wrong." The origin of the do-gooder trojan is unknown, but one can only assume we haven't seen the last of this holier-than-thou hacker's righteous assault on the evils of the world... what's next: sanctimonious spyware?

Steve Jobs: Mac of Mystery?

So, after more than a year of rumours circulating over the alleged ill health of overly thin Apple CEO (and undisputed cult leader of Mac fanboys worldwide) Steve Jobs, it turns out that the supposed mystery illness afflicting the Apple chief is... uh... still officially a mystery then. In an attempt to quell gossipy blogs and divert attention away from Jobs' health (and his absence from the annual keynote at this January's Macworld conference) and towards the proper focus of the event (ie. Apple products), the company released a statement from Jobs which for the first time admitted that a "hormone imbalance" was the cause of the co-founder's gaunt figure. Not giving much further detail, the memo did serve to instil a sense of the iconic man's presence into the company's swansong at Macworld. (Apple has said it will no longer appear at the event, in a clear bid to increase control over product announcements and their timing.) However, only days later, Jobs stood down from his CEO role until mid-2009, citing that his medical problems were "more complex than [he] originally thought".

Feel the force!

Following on directly from last month's R2-D2 case mod story (page 118), Sydney-based readers and fans of all things either sci-fi or techy still have a chance to catch the spectacular 'Star Wars: Where Science Meets Imagination' exhibition at the Powerhouse Museum. Featuring a huge assortment of props, models, costumes and more from all six *Star Wars* films, plus an array of interactive exhibits that explain how real-world tech and science matches up with its fantastic onscreen counterpart, SW: WSMI is a real eye-opener and a fun day out for families, kids and Jedi tragics alike. Running in Sydney until 26 April (with Melbourne to follow from June through to November). Purchase tickets, you must. apc

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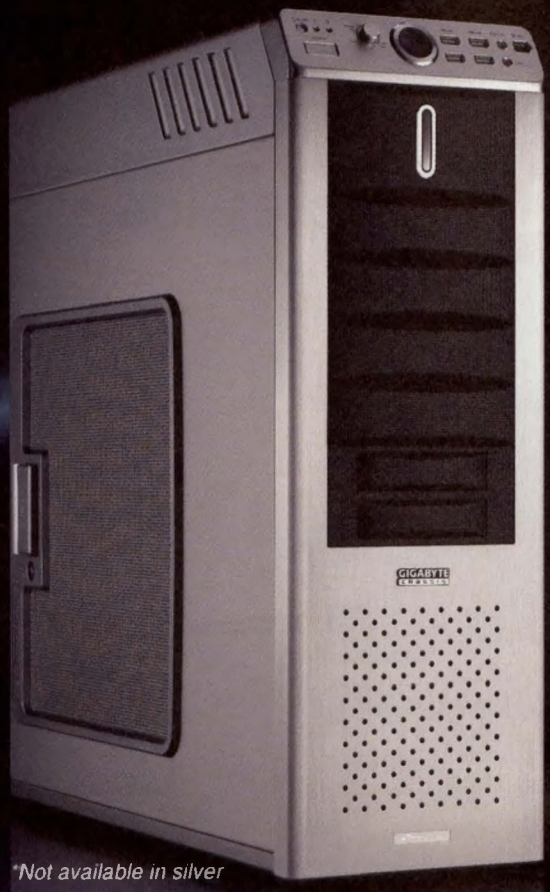

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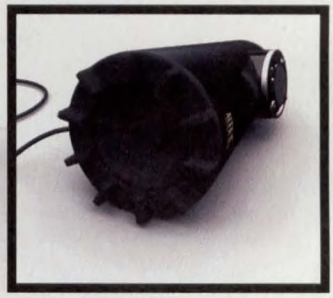

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					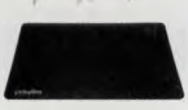		
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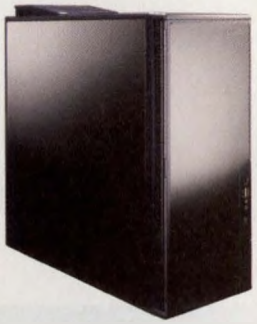

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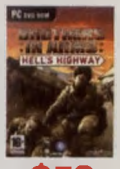

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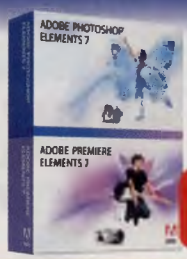

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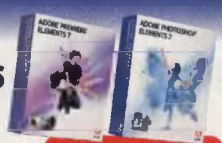

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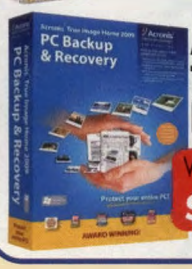

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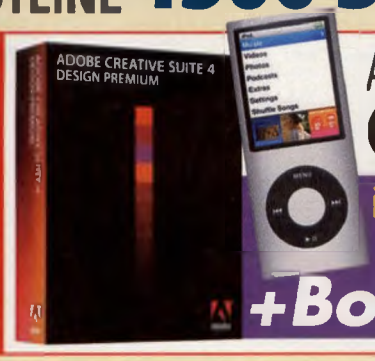

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	Original	Comp
TN-2025	$78	$48
TN-2150	$80	$66
TN-3060/TN-3185	$118	$58
TN-4100	$134	N/A
TN-6600 High	$105	$58
TN-7600 High	$117	$58
TN-8000	$44	$20
LC-67 Bk/CMY	$30/$20	N/A
LC-47 Bk/CMY	$32/$22	$6

	Original	Comp
DR-2025	$137	$96
DR-2125	$142	N/A
DR-3000/3115	$183/$202	$85
DR-4000 Drum	$175	$85
DR-6000 Drum	$187	$85
DR-7000 Dum	$187	$85
DR-8000 Drum	$217	$95
LC-57/LC-37	$32/$21	$6
LC-38 Bk/CMY	$25/$18	N/A

HP :

	Original	Comp
HP-Q1338A	$195	$95
HP-Q2612A	$99	$48
HP-C3906A	$97	$50
HP-C4092A	$83	$50
HP-C4096A	$138	$58
HP-C4127X	$169	$75
HP-C4129X	$211	$90
HP-C4182X	$237	$90
HP-CB435A (35A)	$84	$66
HP-CB436A (36A)	$99	$69
HP-Q5942X	$285	$110
HP-Q5949X	$172	$60
HP-Q6511X	$257	$85
HP-C7115X	$114	$48
HP-C8061X	$169	$65
HP Q7516A	$230	$100
HP-92274A	N/A	$55
HP Q7551X	$277	$75

	Original	Comp
HP-02 Bk/CMY	$28/$19	$10
HP-10&11 B/CMY	$56	$16
HP-21&22 Combo	$42	N/A
HP-40 Bk/CMY	$45/$57	N/A
HP-45 51645A	$44	$24
HP-56 C6656A	$30	$24
HP-57 C6657A	$56	$26
HP-60 Bk/Col	$24/$27	N/A
HP-74 & 75	$25/$27	N/A
HP-78 C6578	$56	$30
HP-88 (CMYK)	$57/$38	$16
HP-94 & 95	$30/$38	N/A
HP-96 C8767WA	$44	$28
HP-97 C9363WA	$57	$32
HP-901-Bk	$25	N/A
HP-901-Colour	$38	N/A
HP-Q7553X	$190	$65
HP-92298X	$151	$60

HP Colour Laser :

CB540A-CB543A	$100/$88	N/A
Q3960A-Q3963A-2550	$120/$137	$86
Q6000A-Q6003A-2600	$105/$120	$86

Q6470A-Q6473A-3600	$174/$173	N/A
C9700A-C9703A-2500	$120/$137	$86
C9720A-C9723A-4600	$197/$258	$104

Konica Minolta:

	Original	Comp
Pagepro 1300 (BK)	$115	N/A
Pagepro 1400W (Bk)	$81	N/A
Pagepro 9100N (Bk)	$285	N/A
QMS 2300(CMYK)	$153/$215	$76/$97
QMS 2400(CMYK)	$153/$217	$99

	Original	Comp
QMS 3300(CMYK)	$103/$285	N/A
QMS 5430(CMYK)	$181/$248	N/A
QMS 5440(CMYK)	$188/$258	N/A
QMS 6100(CMYK)	$370/$472	N/A
QMS 7300(CMYK)	$141/$212	N/A

Lexmark:

	Original	Comp
E120	$104	$60
E210	$141	$55
E220	$126	N/A
E230/330/332 (H.Yield)	$169	$65
E240	$104	N/A
E250	$143	$65
E310/E312 (H.Yield)	$244	$70

	Original	Comp
X215	$105	$55
T620	$134	N/A
T630	$425	$134
C510(CMYK) High	$239/$329	$134
C720(CMYK)	$196/$291	N/A
Inkjet #16	$47	$22
Inkjet #26	$58	$24

Oki:

	Original	Comp
OKI-5100(CMYK)	$99/$220	$65/$86
OKI-5250(CMYK)	$99/$220	$65/$86

	Original	Comp
OKI-9300(CMYK)	$263/$350	N/A
OKI-9600(CMYK)	$179/$454	N/A

Xerox:

	Original	Comp
P8EX	$169	$81
PE-220	$132	$60
203A/204A	$83	$50
DocuCentre 240A	$211	N/A

	Original	Comp
DocuCentre 340A	$324	N/A
WorkCentre C2424	$166	$85/$126
Phaser C525	$133/$203	$65
Phaser 8200	$293/$297	$199/$191

Canon :

	Original	Comp
Cart-303/Q2612A	$96	$50
Cart-308 II/Q5949X	$169	$55
Cart-309/Q7516A	$248	$100
Cart-310 II/Q6511X	$278	$68
Cart N	$236	N/A
Cart-U/EP-26	$117/$96	$50
Cart-W	$156	$50
E-31	$168	$55
FX3	$104	$45
FX-9	$127	$50
EP-22/ C4092A	$86	$50
BCI -21/24 BK	N/A	$4.5
BCI -3eBK/6Bk/C/M/Y	N/A	$4.5
PGI-5Bk/CLI-8 W/Chip	$26/$25	$10

	Original	Comp
EP-25/C7115X	$85	$48
EP-32/C4096A	$150	$58
EPA/C3906A	$88	$50
EPP/92274A	N/A	$55
EPE/92298X	$156	$60
NP-52/C4127X	$188	$75
EP-87 (CMYK)	$123/$141	$86
Cart-301 (CMYK)	$138/$155	$86
Cart-307 (CMYK)	$104/$119	$88
Cart-311 (CMYK)	$164/$200	N/A
Cart-316 (CMYK)	$85/$78	N/A
PG-40/CL-41	$38/$42	N/A
PG-510/CL-511	$28/$31	N/A
PGI-520B/CLI-521	$22	N/A

Canon Chip Resetter For PGI-5 & CLI-8 $45

Epson:

	Original	Comp
EPL-5900/6100	$223	$60
Drum EPL-5900	$170	$80
T0811-T0816	$30(81N)	$ 7
T0751-T0754	$16	$ 7
T0731-T0734	$18(73N)	$ 7
T0621/T0631-T0634	$25/$30	$ 6
T0561-T0564	$20	$ 6
T5591-T5596	$24	$ 6
T0491-T0496	$24	$ 6

	Original	Comp
EPL-6200	$174	$60
Epson C1100	$127/$11	$65
T0461-T0474	$23/$19	$6
T0321-T0424	$59/$25	$6
T038/T039	$23/$31	$5/$7
T028/T029	$58/$45	$5/$7
T026/T027	$43/$38	$5/$7
T007/008/T009	$37/$31/$45	$5/$7
T050/T051/T052/53	N/A	$5/$7

Kyocera:

	Original	Comp
TK-17	$119	$ 45
TK-18	$138	$45
TK-50H	$162	$75
TK-55	$153	$65
TK-60	$137	$69

	Original	Comp
TK-110	$134	$60
FS-5016(CMYK)	$116/$196	N/A
FS-5020(CMYK)	$106/$179	N/A
FS-C8008(CMYK)	$185/$193	N/A
FS-C8026(CMYK)	$197/$314	N/A

Samsung :

	Original	Comp
ML-1210D	$120	$ 55
ML-1610D/2010D	$114	$ 55
ML-1650	$218	N/A
ML-1710D/SCX-4216	$118	$ 55
ML-2250	$143	$ 65
ML-3050	$255	N/A
ML-3560	$171	N/A
ML-4500D	$132	$ 55
ML-5200	N/A	$ 85
ML-6060	$174	$ 99
Ink- M40	$67	$ 20

	Original	Comp
SCX-4100	$118	$55
SCX-4200DA	$119	$55
SF-5100D	$115	$55
SCX-4725	$123	N/A
SCX-4824	$175	N/A
SCX-5312	$106	N/A
CLP-300(CMYK)	$88/$80	$35
CLP-310(CMYK)	$71/$63	N/A
CLP-350 (CMYK)	$104/$96	$60/$50
CLP-510(CMYK)	$158/$165	$104
CLP-600(CMYK	$133/$192	N/A

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2929-1	USB to Serial (RS232) 8 Port	$459
2853-1	USB to RS422/485 1 Port	$249
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11436-1	8 Port Gigabit	$129
11535-1	16 Port Gigabit	$349

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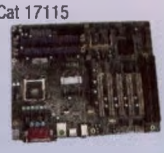

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BiPAC 7404VGOX / 7404VGPX
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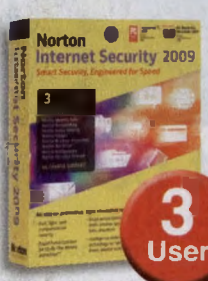

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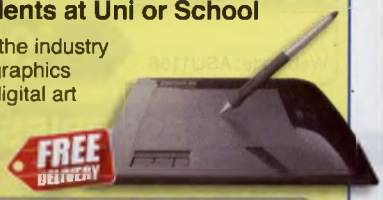

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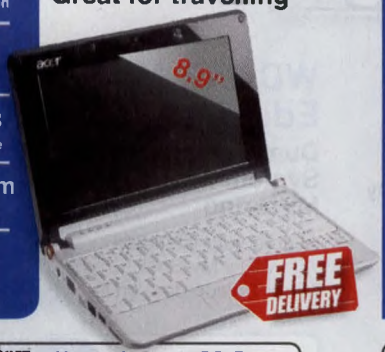

Kingston RAM UPGRADE
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WebCode: NUB0001
$109

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WebCode: TAR1024
$219

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WebCode: LOG3495
$65

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$19

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$19

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WebCode: APP0315 — $89

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WebCode: BEL0244 — $25

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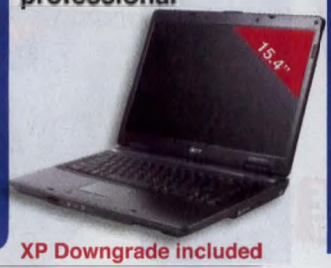
Vista Business



XP Downgrade included

Kingston RAM UPGRADE Upgrade to 4GB Ram for only $99 WebCode: KIN0021

SAVE $137 off RRP
WebCode: ACN1541
$1462

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Extended Warranty

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2GB RAM
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3 Year Warranty
Vista Business

XP Downgrade Included

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$1499

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HDMI connectivity
Vista Home Premium

Kingston RAM UPGRADE Upgrade to 4GB Ram for only $99 WebCode: KNM10044

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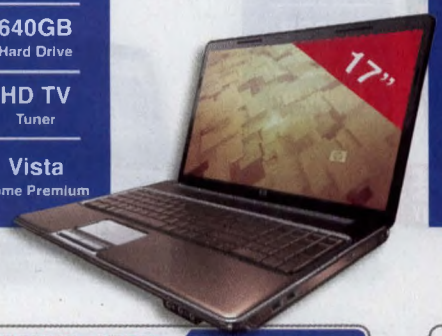

SAVE $217 off RRP
WebCode: HPR1136
$1694

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2.4GHz Intel Core 2 Duo
4GB RAM
400GB Hard Drive
HDMI Connectivity
Vista Home Premium

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$2049

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OS X10.5 Leopard

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$211

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DVD-RW Drive
Vista Home Business

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Monitor not included.

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2GB RAM
320GB Hard Drive
1920 x 1200 Resolution
256MB ATI Radeon HD 2600PRO

SAVE $102 off RRP
WebCode: APP0400 **$2297**

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Win XP (ASD0008) $508

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WebCode: ASM0018 **$217**

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2ms Response time
3 Year Warranty

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1440 x 900 Resolution
5ms Response time
8000:1 Contrast Ratio

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WebCode: SAM3944 **$192**

Benq E2400HD

Gloss black frame

1920 x 1080 Resolution
2ms Response time
HDMI Input

SAVE $69 off RRP
WebCode: BEN1324 **$451**

Acer P244WB

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1920 x 1080 Resolution
2ms Response time
20000:1 Contrast Ratio

SAVE $310 off RRP
WebCode: ACM0107 **$488**

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Netys PE 800VA	(SOC1004)	$198
Netys PE 1000VA	(SOC1002)	$298
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ACCESSORIES

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WebCode: BEL2252
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WebCode: TAR5082
$82

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WebCode: RIT0004
$49

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You just received a scanner for your birthday, but your printer is utilising your parallel port. With the Belkin USB Parallel Printer Adapter you can attach your printer to your USB port and make room for that scanner you always wanted.

- Parallel IEEE 1284 Connectivity
- 1.8M Cable

SAVE $5 off RRP
WebCode: BEL2641
$44.95

Belkin USB Serial Portable Adapter

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WebCode: BEL0200
$54.95

Belkin USB 2.0 File Transfer Cable

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WebCode: BEL1150
$39.95

Comsol Cat 5e Patch Cables Blue

Snagless design

Available in 10 different lengths

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1m	(COM2011)	$4
2m	(COM2012)	$6
5m	(COM2013)	$11
10m	(COM2014)	$21

Comsol Cat 6 Patch Cables

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Available in 10 different lengths

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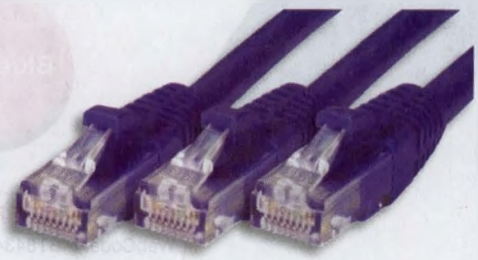
1m	(COM0121)	$8
2m	(COM9060)	$11
5m	(COM9090)	$18
10m	(COM9151)	$26



Comsol Fibre Patch Cables

Full range available

- Standard Multi Mode Duplex OM1
- 10 Gigabit Multi Mode Duplex OM3
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- Available with LC, ST, SC or MTRJ

ServerLink 8 Port Altitude KVM Switch

Direct access at the rack

- Menu driven OSD for convenient control
- USB and PS/2 support on both console and server side
- Advanced hot-plugging for easy re-configuration of racks

4 Port (COM2016) $399
16 Port (COM2015) $749

FREE DELIVERY

SAVE $68 off RRP
WebCode: COM2017
$499

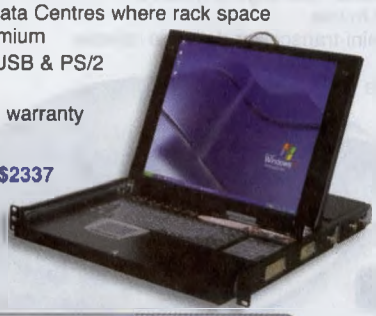
ServerLink ECO Single Port 17" Rack Drawer

Economy & style

- Control and manage servers from a 1U slide out console drawer
- Ideal for Data Centres where rack space is at a premium
- Supports USB & PS/2 servers
- 12 months warranty

8 Port (COM2009) $2337

16 Port (COM2007) $2656



SAVE $196 off RRP
WebCode: COM2005
$1848

ServerLink Single Port 17" Rack Drawer

Patented modular KVM design

- Modular KVM design allows for easy expansion
- Supports USB & PS/2 servers
- Optional remote IP access available
- 3 year warranty

8 Port (COM2008) $2868

16 Port (COM2006) $3294

SAVE $173 off RRP
WebCode: COM2004
$2439

Microsoft Wireless Media Desktop 1000

Ultra-Thin Keyboard Design, High Definition Optical Mouse

A sleek, wireless desktop designed for your digital lifestyle

- Windows Flip 3D Key
- Windows Start Button
- Media Center
- Hot Keys

PC USER BEST BUY

SAVE $35 off RRP
WebCode: MST8491
$64

Microsoft Wireless Laser Desktop 7000

Enjoy style and functionality

This dazzling duo brings the beauty of Windows Aero to your desktop with a translucent design, floating keys, and instant access to Windows Flip 3D. Your hands will be amazed at the ergonomically advanced Comfort Curve keyboard and rechargeable High Definition laser mouse.

SAVE $33 off RRP
WebCode: MST8483
$146

Microsoft LifeCam VX-7000

HD 2.0 megapixel webcam

Now it's fast and easy to share real-time videos and photos with friends and family. And, with a High Definition 2.0 megapixel sensor and noise-canceling microphone, you'll think you're in the same room as your friends!

SAVE $41 off RRP
WebCode: MST8477
$108

Microsoft Arc Mouse

Designed for comfort, folds for portability

You take your notebook PC everywhere! That's why the Arc Mouse is designed to go with you. Expanded, it's a sturdy and comfortable full-sized mouse. Folded, it fits perfectly into your bag.

- Mouse folds to 60% of its fully expanded size
- Micro-transceiver snaps into the bottom of the mouse
- Folding motion turns mouse on/off
- Carrying case included
- Battery Status Indicator
- Laser tracking for precision
- 2.4GHz wireless with up to 30-foot range
- 4 buttons

SAVE $24 off RRP
WebCode: MST8498
$75

Microsoft Presenter Wireless Notebook Mouse 8000

Great tool for professional presentations

Do more and carry less with the first ever notebook mouse with integrated slide presenter, laser pointer, and media remote control. It's an all-in-one super tool for the office, road, and home.

SAVE $24 off RRP
WebCode: MST8434
$105

Microsoft Explorer Mouse

World's most advanced tracking

With revolutionary Microsoft BlueTrack Technology, works more places than ever before, including on granite countertops, living room or airport carpets—even on a wood table or rough, unfinished park bench.

- The battery status indicator tells you when a quick recharge is needed.
- The compact, stable recharging base is easy to use.
- Microsoft 2.4 GHz wireless and the snap-in mini-transceiver deliver a reliable connection with up to a 30-foot range.
- The glowing blue light effects and comfortable curved surfaces set your mouse apart.
- Microsoft BlueTrack Technology combines the power of optical with the precision of laser for remarkable tracking on more surfaces.

SAVE $24 off RRP
WebCode: MST8497
$105

Microsoft Explorer Mini Mouse

A Notebook Mouse That Works on Virtually Any Surface

The Microsoft Explorer Mini Mouse, with revolutionary Microsoft BlueTrack Technology, works more places than ever before, including on granite countertops, living room or airport carpets.

SAVE $18 off RRP
WebCode: MST8495
$81

Verbatim Rapier V2 Gaming Mouse

For precision gaming

- Adjustable dpi setting: 800 to 3200 dpi "on the fly" sensitivity adjustment
- 7 dpi settings available via the software (400 - 3200dpi)
- Reversible foot pads for optimal gaming performance
- Weight adjustment for your preferred setup (7 x removable 4.5 gram weights)
- Gamer Toolkit Software included enabling keyboard key/mouse button combination setting
- Support with 3 group Macro setting saved to the mouse directly
- Verbatim Two Year Limited Warranty

SAVE $36 off RRP
WebCode: VBM9561
$43

Verbatim Rapier V1 Gaming Mouse

Amazing accuracy

- Adjustable dpi setting: 800 to 3200 dpi 'on the fly' sensitivity adjustment
- Teflon feet for a smooth gliding action
- 7 dpi settings available via the software (400 - 3200dpi)
- Weight adjustment for your preferred set up (7 x removable 4.5 gram weights)
- Gamer Toolkit Software included enabling keyboard key/mouse button combination setting.
- Support with 3 group Macro setting; saved to the mouse directly
- Hot key design for "triple click" function
- USB full speed with better transmission
- Verbatim Two Year Limited Warranty

SAVE $32 off RRP
WebCode: VBM9560
$57

Logitech QuickCam Pro 9000

Crystal clear images & a stylish design

Designed for flat panel screens and notebook computers this stylish and compact webcam provides exceptional image quality for keeping in touch with family and friends.

- Up to 8MP images via interpolation
- Automatic face tracking technology
- Skype compatible

SAVE $54 off RRP
WebCode: LOG3650
$129

Logitech MX Air Rechargeable Cordless Air Mouse

Gesture control your PC

- Experience Vista as never before
- Use gestures to scroll pages or skip to next song
- Media Centre compatible

SAVE $121 off RRP
WebCode: LOG3651
$178

Logitech Cordless Number Pad for Notebooks

Data entry made easy

- Wireless connectivity
- Internet browser/calculator buttons
- Carrying pouch
- 3 Years warranty

SAVE $21 off RRP
WebCode: LOG3632
$38

Logitech QuickCam Pro for Notebooks

Portable image-perfect detail

- Up to 8MP images via interpolation
- Automatic face tracking technology
- RightSound & RightLight 2 technology
- Create video avatars

SAVE $76 off RRP
WebCode: LOG3665
$123

Logitech LX310 Cordless Laser Desktop

Power and convenience for your desktop

- Pixel precise photo editing
- One touch controls for music, Internet & mail
- Extended battery life

SAVE $44 off RRP
WebCode: LOG3628
$85

Logitech Cordless Wave Desktop

A must for the professional typist

- Most ergonomic design on the market
- Curves with the natural shape of your hands
- Vista and media quick launch keys

SAVE $95 off RRP
WebCode: LOG3655
$104

D-Link DNS-323 2-Bay Network Storage Enclosure

Secure and share your digital files

The D-Link DNS-323 2-Bay Network Storage Enclosure, when used with SATA drives, enables you to share documents, files, and digital media such as music, photos, and video with everyone on the home or office network. This enclosure also allows you to create a central network point for backing up valuable files.

SAVE $13 off RRP
WebCode: DLK0066
$386

D-Link DSM-330 DivX HD Media Player

Stream high quality video, photos & music wirelessly to your home theatre system

Add the DSM-330 to your wired or wireless home network and access media on your TV/Entertainment system from all your PCs, hard drives and online.

- Stream music, photos and video using 802.11b/g or Ethernet
- Enjoy the high quality media experience in your home theatre.
- Enjoy fast, smooth, stutter-free video, music and photo playback in a rich, remote-controlled TV interface
- HDMI output for the best possible picture (HDMI cable included)
- Highly responsive, remote-controlled trick modes: skip forward 30 seconds, skip back 10 seconds and virtual chapter points

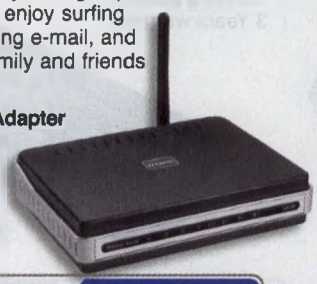
SAVE $101 off RRP
WebCode: DLK3300
$438

D–Link DIR-300 Wireless G Router

Basic wireless networking

Create a wireless network for your home and share it securely with Tomizone using the D-Link Wireless G Router. Connect the Wireless G Router to a broadband modem and wirelessly share your high-speed Internet connection and enjoy surfing the web, checking e-mail, and chatting with family and friends online.

Wireless USB Adapter (DLK3003) $40



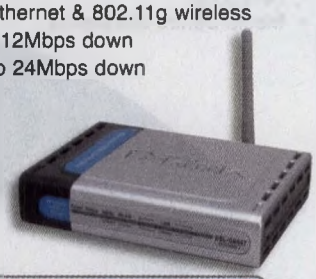
SAVE $20 off RRP
WebCode: DLK3006
$69

D-Link DSL-G604T Wireless-G ADSL Modem Router

Value packed wireless modem

With this router, you can easily connect to your ADSL broadband line for Internet access in your office or at home.

- 4 Port Fast Ethernet & 802.11g wireless
- DSL-2: up to 12Mbps down
- DSL-2+: up to 24Mbps down



SAVE $36 off RRP
WebCode: DLK5109
$123

D-Link DHP-301 Powerline HD Network Starter Kit

Ethernet over existing electrical wires

Create a smooth and secure network with simple plug 'n' play Powerline technology and stream data into hard to reach areas of the home.

- Up to 200Mbps
- Ideal for HD Video, music sharing and on-line gaming.

DHP-300 - Powerline HD Ethernet Adapter (DLK0096) $142

SAVE $60 off RRP
WebCode: DLK0098
$269

D-Link Wireless-G IP Security Camera

High quality wireless video camera

SAVE $54 off RRP
WebCode: DLK5920
$175

D-Link Omni Directional Indoor Antenna 7dBi

Boost your WIFI range

SAVE $21 off RRP
WebCode: DLK9245
$78

Wireless N 14x faster than Wireless-G

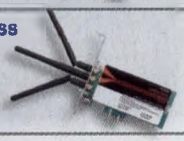
D-Link RangeBooster N USB Adapter DWA-140

SAVE $23 off RRP
WebCode: DLK0090
$96

D-Link RangeBooster N 650 Desktop Adapter DWA-547

SAVE $23 off RRP
WebCode: DLK9205
$96

D-Link Xtreme N PCI Express Desktop Adapter DWA-556



SAVE $23 off RRP
WebCode: DLK0091
$129

D-Link Xtreme N Notebook ExpressCard DWA-643

SAVE $23 off RRP
WebCode: DLK0092
$129

D-Link DIR-655 Xtreme N Gigabit Router

Make the move to wireless-N

Connect the Xtreme N Gigabit Router to a cable or DSL modem and provide high-speed Internet access to multiple computers.

- Draft 802.11n Speeds Up to 14x Faster than Wireless G
- 4 Gigabit ports for 10/100/1000 Mbps wired speed, USB Print Server, Prioritisation technology for Gaming, VoIP and Multimedia streaming

SAVE $43 off RRP
WebCode: DLK0064
$226

NETGEAR WNB2100 Router Kit

Router + Wireless USB Adapter

Upgrade your home network and computer to new Wireless-N

- Internal antennas deliver maximum performance & range
- Automatically checks for and upgrades to the latest firmware for optimal performance
- New Wireless-N router with matching USB adapter delivers superior performance and range

SAVE $81 off RRP
WebCode: NTG8169
$188

NETGEAR DGNB2100 Wireless-N Modem Router

Double firewall and wireless encryption

Wireless-N modem router with matching USB adapter delivers superior performance and range

- WiFi on/off switch to turn off wireless signals
- Privacy & Parental Control included

SAVE $82 off RRP
WebCode: NTG8188
$227

NETGEAR WNR3500 Wireless-N Gigabit Router

Enjoy fast wired and wireless speed

Surf, email, stream HD video, play on-line games, make Internet phone calls–simultaneously.

- Gigabit Ethernet ports deliver ultra-fast wired network connections
- Connect up to 4 other wired devices by using the built-in 4-port switch

SAVE $75 off RRP
WebCode: NTG8126
$274

NETGEAR WIRELESS-N

NETGEAR DGN2000 ADSL2+ Modem Router

Router with built-in ADSL2+ Modem

Surf, make Internet phone calls, play online games and stream HD video simultaneously.

- Replace your old DSL equipment with new Wireless-N
- Efficient Energy Star-compliant power supply

SAVE $63 off RRP
WebCode: NTG8183
$155

NETGEAR WNHDEB111 HD/Gaming Wireless Kit

HD/Gaming 5 GHz Wireless-N Networking

More wireless channels, less interference and better connections using 5 GHz Wireless-N band

- Automatic Quality of Service (QoS) ensures lag-free gaming and jitter-free HD streaming
- For high-performance wireless network gaming and multiple HD video streaming

SAVE $155 off RRP
WebCode: NTG8117
$344

NETGEAR WNR2000 Wireless-N Router

Exceptional range and speed

Use with RangeMax Wireless-N Adapters and boost your performance and range

- Automatically checks for downloads and installs firmware revisions to keep you operating at optimal levels
- Push 'N' Connect securely connects at the touch of a button

SAVE $50 off RRP
WebCode: NTG8165
$109

ProSafe – Managed Switches at an Unmanaged price

NETGEAR ProSafe GS108T 8 Port Smart Managed Switch

- 8 Gigabit Ethernet Ports
- Web-based Management
- ProSupport Extended Warranty Available

SAVE $77 off RRP
WebCode: NTG7993
$282

NETGEAR ProSafe GS716T 16 Port Smart Managed Switch

- Web-based Management
- ProSupport Extended Warranty Available

SAVE $145 off RRP
WebCode: NTG7558
$554

NETGEAR ProSafe GS724T 24 Port Smart Managed Switch

- 2 Fibre Ports
- Web-based Management
- ProSupport Extended Warranty Available

SAVE $143 off RRP
WebCode: NTG7158
$696

Linksys WRT54G2 Wireless G Broadband

4 Port Wireless Router

With the Linksys Wireless-G Broadband Router at the center of your home or office network, you can share a high-speed Internet connection, files, printers, and multi-player games with flexibility, speed, security and simplicity.

SAVE $23 off RRP
WebCode: LNK6287
$76

Linksys WRT160N Ultra RangePlus Wireless-N Router

Excellent range, Excellent price

Internet-sharing Router and 4-port Switch, with a built in speed and range enhanced Wireless Access Point

- MIMO technology uses multiple radios to create a robust signal that travels further and reduces dead spots

SAVE $28 off RRP
WebCode: LNK6284
$171

Linksys WRT610N Simultaneous Dual-N Band Wireless Router

Faster gaming, music, and HD video streaming

Internet-sharing router and 4-port Gigabit Switch with built-in dual-bands that will increase speed and range. Connect a hard drive or flash-based USB storage device and share across a nework.

SAVE $91 off RRP
WebCode: LNK6300
$338

Linksys WUSB54GC Wireless-G USB Adapter

SAVE $20 off RRP
WebCode: LNK5532
$49

Linksys WUSB600N Dual-Band Wireless-N USB Network Adapter

SAVE $67 off RRP
WebCode: LNK6290
$132

Linksys WMP300N Wireless-N PCI Adapter

SAVE $67 off RRP
WebCode: LNK5545
$132

LELA
LINKSYS EASYLINK ADVISOR

YOUR PERSONAL TECHNOLOGY EXPERT

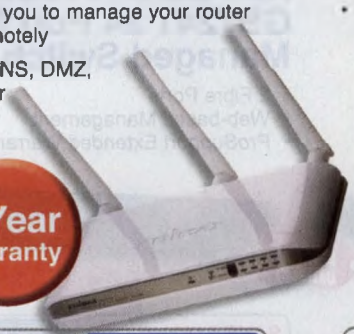
New to setting up a wireless network? LELA is a free software included with the New Design Linksys Routers. Easy to install and effortless to use - Wireless-N with LELA lets you stay connected wirelessly, giving you the freedom to do whatever you need to do.

LINKSYS by Cisco

Edimax BR-6574n Wireless N Gigabit Router

Ideal for Small Office / Home Users

- Built in Edimax EZView management system which allows you to manage your router locally or remotely
- Supports DDNS, DMZ, Virtual Server & QoS

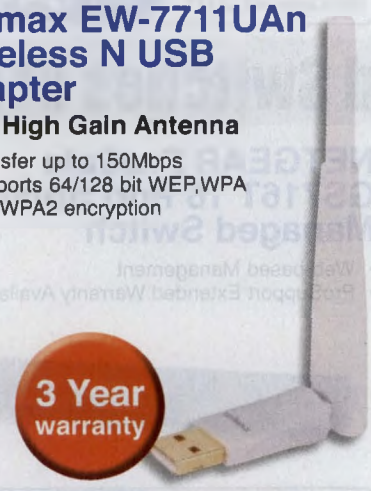


SAVE $10 off RRP
WebCode: EDI1000
$189

Edimax EW-7711UAn Wireless N USB Adapter

3dBi High Gain Antenna

- Transfer up to 150Mbps
- Supports 64/128 bit WEP,WPA and WPA2 encryption



SAVE $6 off RRP
WebCode: EDI1001
$59

Edimax AR-7265WnA Wireless ADSL2+ Modem Router

ADSL2+ standard with the superb reliability

- Increases your wireless speed up to 12 times faster and extend your coverage further
- Up to 24Mbps Downstream & 1Mbps Upstream

WebCode: EDI1002
$179

ProCurve
Networking by HP

To get to the top you've got to be the BEST!

HP ProCurve 2610 Switch Series

For small and mid-sized businesses the new ProCurve Switch 2610 Series offers security and world-class reliability. It's backed by the ProCurve Lifetime Warranty and is ideal for connecting multiple devices such as VoIP (voice over IP), wireless LANs and security cameras.

The Series consists of five switches—the 2610-24 and 2610-48 provide 24 and 48 ports of 10/100 connectivity.
The 2610-24/12PWR, 2610-24 PWR, and 2610-48-PWR are IEEE 802.3af-compliant for Power over Ethernet(PoE)
All switches include two 10/100/1000Base-T ports and two mini-GBIC slots for Gigabit uplink connectivity.
With static routing, robust security and management features, free lifetime warranty, and free software updates, the 2610 series is a cost-effective solution for builders of converged enterprise edge networks.

(Procurve 2610-24/12PWR Switch

~~$1287.00~~ Save $204.00

(WebCode. ..... .HPE9086)

New Colubris Wireless now available

HP ProCurve Msm422 WW Access Point

The MSM422 Access Point is a 2 radio (802.11a/b/g) capable of operating in client access, with self-healing local mesh.

(Procurve MSM422 WW Access Point

~~$1207.00~~ Save $452.00

(WebCode. ..... .HPE9359)

HP Procurve Msm310 WW Access Point

- 2 RJ-45 auto-sensing 10/100
- 802.3 Type 10Base-T, IEEE 100Base-TX)
- Duplex: half or full
- IEEE 802.11g Further Higher Data Rate extension in the 2.4 GHz Band

(Procurve MSM310 WW Access Point

~~$733.00~~ Save $226.00

(WebCode. ..... 9379)

For more information about ProCurve products
http://www.hp.com/rnd/products/wireless/index.htm

hp invent

For as long as you own the product,with next-business-day advance replacement (available in most countries). The following hardware products and their related family modules have a one-year warranty with extensions available: The ProCurve Routing Switch 9300m Series,ProCurve Switch 8100flSeries,ProCurve Access Control Server 745wl and the ProCurve Network Access Controller 800. Stand-alone software may have a different warranty duration. For details,refer to the ProCurve Software License,Warranty and Supportbooklet at: http://www.hp.com/rnd/support/warranty/index.htm
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1300 761 761 ww.csw-it.com.au CSW-IT

Lexmark X4850 3-In-1 Multifunction

Provide maximum performance for your home

The Lexmark X4850 Wireless All-in-One offers the convenience of wireless technology combined with all the features you can expect from a quality inkjet 2.4" screen & PictBridge this multifunction has it all. Produce high resolution scan documents and easily copy with 1-touch of a button.

- 27ppm Colour
- 4800x1200 dpi Printing
- 600x1200dpi Scanning
- USB, 802.11b/g Wireless
- On-site warranty

SAVE $64 off RRP
WebCode: LEX4850
$135

Lexmark X6575 4-In-1 Wireless Multifunction

Ideal printing solution for business

Perfectly suited for business this multifunction offers all that you could need for your business. Print directly from memory card or print PDF's Directly from USB flash drives. With built in wireless you can share your printer across your network with wireless enabled computers.

- 28ppm Mono
- 24ppm Colour
- 4800x2400 dpi Printing
- 600x1200 dpi Scanning
- Auto document feeder
- Card reader

$50* Cashback!

*See citysoftware.com.au/promotions

SAVE $150 off RRP
WebCode: LEX6575
You Pay $198
$148
After $50 Cashback

Lexmark X9575 4-In-1 Wireless Multifunction

Share your Multifunction via wireless

This Wireless All-in-One with Fax offers the convenience of wireless technology combined wit two-sided printing

- 33ppm Mono
- 28ppm Colour
- 2800x2400 dpi Printing
- 1200x4800 dpi Scanning
- USB 802.11g/b/n, Ethernet
- Auto document feeder
- Double sided printing

$75* Cashbac

*See citysoftware.com.au/promotions

SAVE $150 off RRP
WebCode: LEX9575
You Pay $236
$161
After $75 Cashback

Lexmark E360dn Mono Laser

Duplexer Built-In

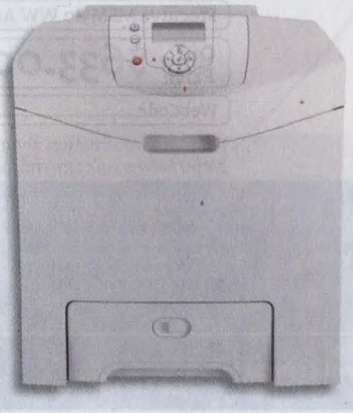
- 38ppm Mono
- 1200 x 1200 DPI
- Ethernet, USB 2.0, Parallel
- 80,000 Page Duty Cycle
- 550 Sheet Paper Tray

SAVE $369 off RRP
WebCode: LEX2605
$475

Lexmark C534DN Colour Laser

An extreme performance business partner

- 22ppm Mono, 21ppm Colour
- 1200 x 1200 DPI
- Ethernet, USB 2.0
- 100,000 Page Duty Cycle
- 550 Sheet Paper Tray



SAVE $698 off RRP
WebCode: LEX5340
$1164

Lexmark X560n Colour Multifunction

Colourful efficiency for medium-sized workgroups

Robust, reliable and ready to go to work. With PostScript 3 and PCL6 compatibility, it ensures perfect integration into any IT environment.

- 30ppm Mono, 20ppm Colour
- 600 x 600 DPI
- Ethernet, USB 2.0
- 11 Second Start
- 400 Sheet Paper Tray

$150* Cashback!

*See citysoftware.com.au/promotions

SAVE $1084 off RRP
WebCode: LEX9575
You Pay $1047
$897
After $150 Cashback

Fuji Xerox Phaser 3428DN A4 Mono Laser

Robust business laser

- 28ppm Mono
- Up to 1200 x 1200 DPI
- Parallel, USB, Ethernet
- 65,000 Duty Cycle
- Memory 32MB

Black Toner
(FXP3431) $152

SAVE $129 off RRP
WebCode: FXP3429
$693

Fuji Xerox DocuPrint 340A A4 Mono Laser Printer

Huge duty Cycle

- 34ppm Mono
- Up to 1200 x 1200 DPI
- 150,000 Duty Cycle
- Parallel, Serial, USB, Ethernet

Black Toner 10k
(FXP0268) $184
Black Toner 17k
(FXP0269) $288

SAVE $247 off RRP
WebCode: FXP0346
$1319

Fuji Xerox DocuPrint C2100 A4 Colour Laser

Affordable colour laser

- 25ppm Mono
- 17ppm Colour
- 9600 x 600 DPI
- 60,000 Page Duty Cycle
- Parallel, USB, Ethernet

Black Toner 3k
(FXP2110) $136
Black Toner 8k
(FXP2106) $256

SAVE $209 off RRP
WebCode: FXP2100
$698

Fuji Xerox DocuPrint C3055DX A3 Colour Laser

Eye-catching colours for POS advertising

- 35ppm Mono, 8ppm Colour
- 600 DPI Resolution
- Duplex Printing
- USB 2.0, IEEE 1284, Ethernet 10/100 Connectivity

Black Toner 6.5k
(FXP3063) $93

SAVE $1041 off RRP
WebCode: FXP3055
$1984

Fuji Xerox Phaser 8560DN A4 Colour Laser

Solid ink technology

- 30ppm Colour
- 600 x 600 DPI
- 85,000 Page Duty Cycle
- Parallel, Serial, USB, Ethernet

SAVE $496 off RRP
WebCode: FXP0562
$1698

Fuji Xerox WorkCentre PE220 A4 Mono Laser Multifunction

Budget multifunction printer

- 20ppm Mono
- 600x600 DPI
- Parallel, USB
- Print / Scan Copy / Fax

SAVE $245 off RRP
WebCode: FXP1220
$304

Fuji Xerox DocuPrint C2090FS A4 Colour Laser Multifunction

For all your office needs

- 20ppm Mono
- 5ppm Colour
- 600 x 600 DPI
- USB, Ethernet Fax Print / Scan / Copy

SAVE $701 off RRP
WebCode: FXP2090
$749

Fuji Xerox Phaser 8560D A4 Colour Laser Multifunction

Solid ink multifunction

- 30ppm Mono
- 30ppm Colour
- 600 x 600 DPI
- USB, Ethernet Fax Print / Scan / Copy

SAVE $726 off RRP
WebCode: FXP0564
$3870

Canon PIXMA MP480 Multifunction

Quality prints, copies and scans

- 4800x2400 Dpi
- 20ppm Colour
- 16ppm Mono
- 1.8" LCD
- USB 2.0

SAVE $14 off RRP
WebCode: CNN0480
$85

Canon PIXMA MP980 Multifunction

Bluetooth enabled All-in-One photo solution

- 9600x2400 Dpi
- 26ppm Colour
- 21ppm Mono
- 2 Picolitre Droplet
- USB 2.0

SAVE $70 off RRP
WebCode: CNN0980
$379

Canon PIXMA iP4600

Outstanding, vibrant photos and documents at home

- 9600x2400 Dpi
- 40ppm Colour
- 40ppm Mono
- 1 Picolitre Droplet
- USB 2.0, Bluetooth, Ethernet

SAVE $24 off RRP
WebCode: CNN0009
$145

Canon PIXMA Pro9000 A3+

True-to-life colour photos for serious photographers

- 4800x2400 Dpi
- 15ppm Colour
- 16ppm Mono
- 2 Picolitre droplet
- 8 Colour Ink System

SAVE $149 off RRP
WebCode: CNN9000
$949

Epson PictureMate PM215

Print Photos at home for only 26c Each

- 37 Second print
- 2.5" LCD Screen
- Border free Printing
- PC Not Required

150Pg Ink + Paper Pack
(EPA8529) $39

FREE DELIVERY

SAVE $40 off RRP
WebCode: EPI0215
$169

Epson Stylus TX100

Multifunction delivering high quality results

- 26ppm Colour, 14ppm Mono
- 5760 dpi Printing
- 600dpi Scanning
- 4 Picolitre Droplet

SAVE $6 off RRP
WebCode: EPI0100
$73

Epson Stylus Photo TX700W

6 Colour photo multifunction

- 40ppm Colour / Mono
- 5760 Dpi Printing
- 2400x4800 Dpi Scanning
- 1.5 Picolitre Droplet

SAVE $33 off RRP
WebCode: EPI0702
$265

Samsung CLX-6210FX Colour Multifunction

Cost effective colour printing

The ultimate colour business multifunction machine has arrived with the lowest cost colour page output in its class.

- 20 ppm colour and mono
- Low colour and mono running costs
- Duplex print / Copy / Scan / Print
- Scanner and fax
- USB or Ethernet/network connection
- Scan directly to PC, email or network
- Direct USB thumb drive interface
- 50 page automatic document feed
- 250 sheet paper tray with option to add paper trays
- Wireless card option available
- 1 year onsite warranty

SAVE $369 off RRP
WebCode: SAM6210
You Pay $880
$630
After $250 Cashback

SAMSUNG

Print Solutions

Samsung is the world's fastest growing print brand. Samsung's latest generation printers are feature rich, compact in size and offer low ongoing running costs. Now there is a genuine alternative for business and home office customers looking for exceptional value for money.

Why buy Samsung printers?

Reduced costs – Samsung printers are designed to reduce the total cost of ownership of owning a printer. With fewer moving parts less long term maintenance is required, and by using the toner save function Samsung printers get up to 30% more prints from toner cartridges.

Greater flexibility – No matter what type of setup you have you will find a Samsung printer to meet your needs. Choose from'USB, Ethernet, Wireless or USB direct interface. USB direct interface allows you to print directly from USB devices such as flash drives and digital cameras.

Quieter Operation – Samsung's patented NO-NOIS technology reduces loud mechanical noise and vibration, keeping your workplace free from distraction.

Environmentally Friendly – Samsung is constantly working to reduce not only their carbon footprint, but also their suppliers. Products are designed to be eco-friendly and Samsung's recycling program is ever expanding. Samsung's focus on being eco-friendly has been recognised with many Blue Angel **Certifications –** the first and best know global eco-label.

Samsung CLP-310 Colour Laser

Personal Colour Laser Printing

- 16ppm Mono
- 4ppm Colour
- 2400x600dpi
- 14 Second fast print
- USB

SAVE $99 off RRP
WebCode: SAM0310
$169.95

Samsung CLP-610ND Colour Laser

Efficient and sharp detail

- 20ppm Colour
- 2400x600 dpi printing
- Built-in Duplexer
- USB, Ethernet
- 1 Year warranty

SAVE $409 off RRP
WebCode: SAM0610
You Pay $489
$289
After $200 Cashback

Samsung SCX-4828FN Mono Multifuntion

Ideal for all your business needs

- Print, Scan, Copy, Fax
- 28ppm Mono
- Built-in Duplexer
- USB, Ethernet

SCX-4824 FN
(SAM4824) $319

SAVE $190 off RRP
WebCode: SAM4829
You Pay $409
$309
After $100 Cashback

City Software – The Ink & Toner Specialists

A Huge Range at Great Prices.
Finding the right Ink or Toner is easy with City Software

Visit www.citysoftware.com.au or call 1300 658 600

SOLID INK

Solid Ink		Price	Yield
Fuji Xerox 108R00723 - Cyan	FXP0570	$146	3400 Pg
Fuji Xerox 108R00724 - Magenta	FXP0571	$146	3400 Pg
Fuji Xerox 108R00725 - Yellow	FXP0572	$146	3400 Pg
Fuji Xerox 108R00727 - Black	FXP0573	$115	6800 Pg
Fuji Xerox 108R00723 - Cyan	FXP0570	$146	3400 Pg
Fuji Xerox 108R00724 - Magenta	FXP0571	$146	3400 Pg
Fuji Xerox 108R00725 - Yellow	FXP0572	$146	3400 Pg
Fuji Xerox 108R00727 - Black	FXP0573	$115	6800 Pg

Solid Ink
Easier to use than colour lasers or inkjets, solid ink delivers high performance, a very low cost of ownership and outstanding print quality.

INK

Part No	Colour	Webcode	Price
BROTHER			
LC 47BK	Black	BRT0061	$38
LC-47C	Cyan	BRT0062	$21
LC 47M	Magenta	BRT0063	$21
LC-47Y	Yellow	BRT0064	$21
CANON			
BCI 3EBK	Black	BCI3EBK	$17
BCI 3EC	Cyan	BCI3EC	$16
BCI 3EPC	Photo Cyan	ISWCAN274	$16
BCI 3EM	Magenta	BCI3EM	$16
BCI 3EPM	PH Magenta	BCI3EPM	$16
BCI-3EY	Yellow	BCI3EY	$16
BCI 6BK	Black	CAN0048	$22
BCI 6PC	Photo Cyan	CAN0049	$22
BCI 6C	Cyan	CAN0050	$22
BCI 6M	Magenta	CAN0051	$22
BCI 6PM	PH Magenta	CAN0052	$22
BCI 6Y	Yellow	CAN0053	$22
CLI 8BK	Black	CAN0429	$23
CLI 8C	Cyan	CAN0430	$23
CLI 8M	Magenta	CAN0431	$23
CLI 8PC	Photo Cyan	CAN0432	$23
CLI 8PM	PH Magenta	CAN0433	$23
CLI 8Y	Yellow	CAN0434	$23
PGI 5BK	Black	CAN0437	$20
EPSON			
T028	Black	EPA0060	$46
T029	Tri Colour	EPA0061	$41
T0491	Black	EPA0890	$19
T0492	Cyan	EPA0511	$19
T0493	Magenta	EPA0512	$19
T0494	Yellow	EPA0513	$19
T0495	Light Cyan	EPA0514	$19
T0496	Light Magenta	EPA0515	$19
T0621	Black	EPA0621	$22
T0632	Cyan	EPA0632	$14
T0633	Magenta	EPA0633	$14
T0634	Yellow	EPA0634	$14
T0542	Cyan	EPA0818	$20

Part No	Colour	Webcode	Price
EPSON			
T0543	Magenta	EPA0819	$20
T0544	Yellow	EPA0821	$20
T0547	Red	EPA0822	$20
T0548	Matte Black	EPA0816	$20
T0549	Blue	EPA0823	$20
T009	5 Colour	EPA1270	$41
T007	Black	EPA1271	$31
T0341	Black	EPA2100	$19
T0342	Cyan	EPA2103	$19
T0343	Magenta	EPA2104	$19
T0344	Yellow	EPA2105	$19
T0345	Light Cyan	EPA2106	$19
T0346	Light Magenta	EPA2107	$19
T0347	Light Black	EPA2102	$19
T0591	Black	EPA2400	$22
T0592	Cyan	EPA2401	$22
T0593	Magenta	EPA2402	$22
T0594	Yellow	EPA2403	$22
T0595	Light Cyan	EPA2404	$22
T0596	Light Magenta	EPA2405	$22
T0597	Light Black	EPA2406	$22
T0598	Matte Black	EPA2407	$22
T0599	Light Light Blk	EPA2408	$22
T0961	Photo Black	EPA6191	$22
T0962	Cyan	EPA6290	$22
T0963	Magenta	EPA6390	$22
T0964	Yellow	EPA6490	$22
T0965	Light Cyan	EPA6590	$22
T0966	Light Magenta	EPA6690	$22
T0967	Light Black	EPA6790	$22
T0968	Matte Black	EPA6890	$22
T0969	Light Light Blk	EPA6990	$22
T0870	Gloss Optimiser	EPA8709	$22
T0871	Photo Black	EPA8719	$22
T0872	Cyan	EPA8729	$22
T0873	PH Magenta	EPA8739	$22
T0874	Yellow	EPA8749	$22
T0877	Magenta	EPA8779	$22
T0879	Orange	EPA8799	$22

Part No	Colour	Webcode	Price
HEWLETT PACKARD			
HP 02	Twin Pack Blk	HPD0150	$52
HP 60	Black	HPD0640	$21
HP 60	Colour	HPD0643	$25
HP 45	Black	HPD095	$47
HP 49	Tri Colour	HPD0990	$54
HP 10	Black	HPD4844	$52
HP 18	Black	HPD4936	$32
HP 18	Cyan	HPD4937	$24
HP 18	Magenta	HPD4938	$24
HP 18	Yellow	HPD4939	$24
HP 14D	Tri Colour	HPD5001	$52
HP 78	Tri Colour	HPD6576	$96
HP 78	Tri Colour	HPD6578	$53
HP 20	Black	HPD6654	$50
HP 56	Black	HPD6656	$32
HP 58	Photo Colour	HPD6658	$41
HP 02	Magenta	HPD8277	$15
HP 02	Black	HPD8721	$29
HP 96	Black	HPD8767	$48
HP 02	Cyan	HPD8771	$15
HP 21	Black	HPD9351	$24
HP 22	Tri Colour	HPD9352	$28
HP 93	Tri Colour	HPD9361	$31
HP 92	Black	HPD9362	$23
HP 98	Black	HPD9364	$27
HP 101	Blue	HPD9365	$40
HP 88	Black	HPD9396	$53
HP 88	Cyan	HPD9391	$38
HP 88	Magenta	HPD9392	$38
HP 88	Yellow	HPD9393	$38
HP 38	Pigment Yellow	HPD9417	$49
HP 94	Black	HPD9765	$32
HP 11	Cyan	HPG4836	$60
HP 11	Magenta	HPG4837	$60
HP 11	Yellow	HPG4838	$60
HP 85	Cyan	HPG9425	$62
HP 57	Tri Colour	HPI6657	$53

LASER PRINTER PAPER

	WebCode	Price	Size	GSM
HP Laser Photo Paper - Glossy Photo Paper - 150 Sheet	HPD6616	$28	A4	160
HP A4 Laser Photo Matte 100 Sheet	HPD6550	$25	A4	200

INKJET PRINTER PAPER

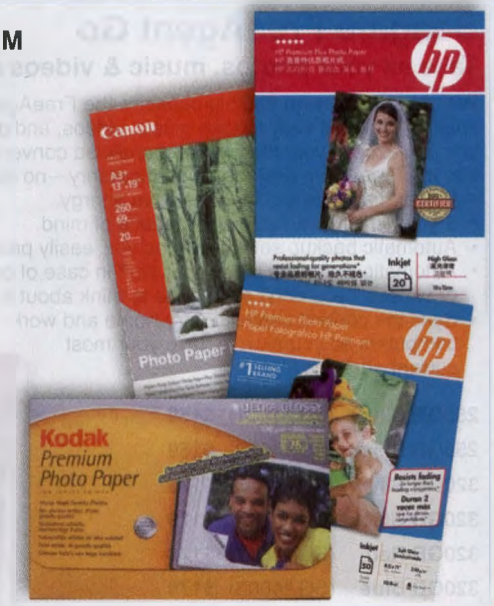
HP Everyday Photo Paper - Semi Gloss - 100 Sheet	HPD5441	$14	4x6	165
Epson Glossy Photo Paper - 50 Sheet	EPA0420	$9	4x6	225
HP Premium Plus Photo Paper - High-Gloss - 25 Sheet	HPD8027	$12	4x6	280
Canon HR 101N - High Resolution Paper - 100 Sheet	CAN0112	$37	A4	110
Canon MP 101 - Matte Photo Paper - 50 Sheet	CAN0107	$16	A4	170
Epson Double Sided Matte Paper	EPA5063	$23	A4	178
Canon GP 401 - Glossy Photo Paper - 20 Sheet	CAN0173	$14.95	A4	190
Kodak Premium Photo Paper Glossy - 50 Sheet	KOD7737	$27	A4	240
Epson Glossy Photo Paper - 20 Sheet	EPA5006	$27	A4	255
HP Premium Plus - High-Gloss Photo Paper - 20 Sheet	HPD6833	$19.95	A4	280

DOUBLE SIDED PAPER

Epson Double Sided Matte Paper - 50 Sheet	EPA5063	$23	A4	178

TRANSPARENCIES

Canon CF 102 - Transparencies - 20 Sheet	CAN0594	$30	A4	-----



TONERS

Part No	Colour	Yield	Webcode	Price
BROTHER				
TN-6600	Black	6,000	BRO0009	$104
TN-3060	Black	6,700	BRT0032	$137
TN-7300	Black	3,300	BRT0044	$100
TN 2025	Black	2,500	BRT0060	$95
TN-3185	Black	7,000	BRT0103	$142
TN-155BK	Black	5,000	BRT0202	$149
TN-2130	Black	1,500	BRT0206	$52
TN 7600	Black	6,500	BRT040	$135
TN-8000	Black	2,200	BRT110	$52
CANON				
EP-22	Black	2,500	CAN0040	$64
303	Black	2,500	CAN0416	$75
U	Black	2,500	CAN0502	$77
FX 9	Black	2,000	CAN0621	$111
EPSON				
S050100	Black	4,500	EPA1900	$108
S050097	Yellow	4,500	EPA1901	$246
S050098	Magenta	4,500	EPA1902	$246
S050099	Cyan	4,500	EPA1903	$246
O187	Yellow	4,000	EPL1105	$183
O188	Magenta	4,000	EPL1106	$183
O189	Cyan	4,000	EPL1107	$183
O190	Black	4,000	EPL1104	$115
FUJI XEROX				
CT200649	Black	4,000	FXP0535	$121
CT200652	Yellow	4,000	FXP0532	$212
CT200651	Magenta	4,000	FXP0533	$212
CT200650	Cyan	4,000	FXP0534	$212
CT201114	Black	2,000	FXP1114	$98
CT201115	Cyan	2,000	FXP1115	$142
CT201116	Magenta	2,000	FXP1116	$142
CT201117	Yellow	2,000	FXP1117	$142
CT200649	Black	4,000	FXP0535	$121
CT200920	Cyan	1,500	FXP2095	$144
CT200921	Magenta	1,500	FXP2094	$144
CT200922	Yellow	1,500	FXP2093	$144
CT350251	Black	10,000	FXP0251	$303
CT350268	Black	10,000	FXP0268	$184

Part No	Colour	Yield	Webcode	Price
FUJI XEROX				
CT350485	Black	8,000	FXP2106	$256
CT350486	Cyan	6,000	FXP2107	$273
CT350487	Magenta	6,000	FXP2108	$273
CT350488	Yellow	6,000	FXP2109	$273
CT350481	Black	3,000	FXP2110	$137
CT350482	Cyan	2,000	FXP2111	$154
CT350483	Magenta	2,000	FXP2112	$154
CT350484	Yellow	2,000	FXP2113	$154
CWAA0649	Black	2,500	FXP2416	$76
CT200655	Black	9,000	FXP2542	$116
HEWLETT PACKARD				
CB540A	Black	2,200	HPL0540	$108
CB541A	Cyan	1,400	HPL0541	$99
CB542A	Yellow	1,400	HPL0542	$99
CB543A	Magenta	1,400	HPL0543	$99
12A	Black	2,000	HPL2612	$123
15A	Black	2,500	HPL7115	$108
36A	Black	2,000	HPL0436	$107
53A	Black	3,000	HPL7553	$142
Q3960A	Black	5,000	HPL3960	$146
Q3971A	Cyan	2,000	HPL3970	$130
Q3972A	Yellow	2,000	HPL3976	$130
Q3973A	Magenta	2,000	HPL3977	$130
Q3961A	Cyan	4,000	HPL3978	$175
Q3962A	Yellow	4,000	HPL3979	$175
Q3963A	Magenta	4,000	HPL3981	$175
96A	Black	5,000	HPL4096	$176
Q5949A	Black	2,500	HPL5949	$126
Q5942A	Black	10,000	HPL5942	$262
Q5950A	Black	11,000	HPL5950	$290
Q5951A	Cyan	10,000	HPL5951	$443
Q5952A	Yellow	10,000	HPL5952	$417
Q5953A	Magenta	10,000	HPL5953	$443
Q5949X	Black	6,000	HPL5994	$230
Q6000A	Black	2,500	HPL6060	$134
Q6001A	Cyan	2,000	HPL6061	$146
Q6002A	Yellow	2,000	HPL6062	$146
Q6003A	Magenta	2,000	HPL6063	$146

Part No	Colour	Yield	Webcode	Price
LEXMARK				
C500H2KG	Black	5,000	LEX1502	$243
C500H2CG	Cyan	3,000	LEX1503	$214
C500H2YG	Yellow	3,000	LEX1504	$214
C500H2MG	Magenta	3,000	LEX1505	$214
E250A11P	Black	3,500	LEX2506	$163
34217HR	Black	2,500	LEX6424	$133
C5220KS	Black	4,000	LEX6436	$184
C5220CS	Cyan	3,000	LEX6435	$208
C5220MS	Magenta	3,000	LEX6437	$208
C5220YS	Yellow	3,000	LEX6438	$208
KONICA MINOLTA				
1710590-004	Black	4,500	QMS2404	$144
1710590-001	Yellow	1,500	QMS2401	$99
1710590-002	Magenta	1,500	QMS2402	$99
1710590-003	Cyan	1,500	QMS2403	$99
1710583-001	Black	6,000	QMS5433	$185
1710590-005	Yellow	4,500	QMS2405	$217
1710590-006	Magenta	4,500	QMS2406	$217
1710590-007	Cyan	4,500	QMS2407	$217
SAMSUNG				
ML-1710D3	Black	3,000	SAM1703	$130
ML-2010D3	Black	3,000	SAM2011	$120
CLP-C350A	Cyan	2,000	SAM3009	$87
CLP-M350A	Magenta	2,000	SAM3011	$87
CLP-Y350A	Yellow	2,000	SAM3012	$87
CLP-500D7K	Black	7,000	SAM5002	$163
CLP-500D5C	Cyan	5,000	SAM5003	$190
CLP-500D5M	Magenta	5,000	SAM5004	$190
CLP-500D5Y	Yellow	5,000	SAM5005	$190
SCX-5312D6	Black	6,000	SAM5326	$98
CLP-K660B	Black	5,500	SAM6361	$141
CLP-C660B	Cyan	5,000	SAM6362	$206
CLP-M660B	Magenta	5,000	SAM6363	$206
CLP-Y660B	Yellow	5,000	SAM6364	$206
CLT-K409S	Black	1,500	SAM6564	$76
CLT-C409S	Cyan	1,000	SAM6565	$65
CLT-M409S	Magenta	1,000	SAM6566	$65
CLT-Y409S	Yellow	1,000	SAM6567	$65

Seagate FreeAgent Go

Take all your photos, music & videos everywhere.

With its sleek design and big capacity, the FreeAgent Go portable storage solution makes it easy to take music, videos, and documents everywhere. Plus, you can access your files with unparalleled convenience by popping your drive into the FreeAgent desktop dock accessory—no more fumbling for cables!

- Power management features save energy.
- 5-year limited warranty offers peace of mind.
- Automatic backup software helps you easily protect your data.
- Automatically backs up all your stuff in case of crashes or viruses - you don't even have to think about it.
- Sync the content between your home and work computers so you always have your most current versions.

250GB Silver (SGA4001) **$159**
250GB Black (SGA4002) **$159**
320GB Silver (SGA4003) **$179**
320GB Black (SGA4004) **$179**
320GB Red (SGA4007) **$179**
320GB Blue (SGA4008) **$179**
500GB Silver (SGA4005) **$279**
500GB Black (SGA4006) **$279**

ACTUAL SIZE

Seagate Accessory Pack

Docking Station

Travel Case

SAVE $10 off RRP
WebCode: SGA4009
$39

Seagate 500GB FreeAgent Desk

Easily protect your data with automatic backup Software

Smart. Simple. Sleek. Store and safeguard all your favorite files—photos, music, videos, documents, you name it—in a stylishly designed desktop storage solution that's as powerful as it is beautiful. Take advantage of the FreeAgent Desk's flexibility and lay it on its side, or stand it upright to maximise your workplace. Light-weight but durable brushed metal finish delivers both style and function.

- Power management feature saves energy.
- 5-year limited warranty offers peace of mind.

1TB (SGA4106) **$259**

SAVE $23 off RRP
WebCode: SGA4104
$179

Verbatim 250GB 2.5" Premium Edition Portable Hard Drive

Palm-sized and light weight making it easy to carry with you.

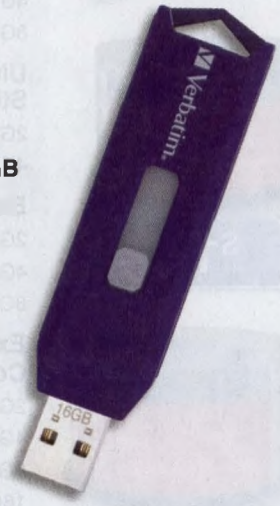
Weighing only 150 grams it packs portability and capacity in one!
Store and carry your digital and day to day working files on this truly mobile drive.

- Transfer documents and data easily between home and office
- Safely back up and store all your files from your PC or laptop
- USB plug 'n' play (no additional power required)

SAVE $40 off RRP
WebCode: VBM9551
$139

Verbatim 16GB Store"n"go Mini Traveller

Store'n'Go Retractable USB Drive 8GB



- Retractable USB connector eliminates the inconvenience of caps
- Securely attach to a lanyard or keyring
- LED light signals when data is being transferred
- Free password protection software
- Enhanced for Windows Readyboost
- Data Retention: 10 years
- Verbatim 2 year limited warranty

SAVE $28 off RRP
WebCode: VBM9550
$59

Verbatim 1TB 3.5" USB 2.0 Portable Hard Drive

Nero back up software included

Store thousands of digital photos, videos, music and other electronic files. Powered by a SATA hi-speed hard drive, the external hard drive races through the most demanding audio/video applications.

- Sleek 'black steel' space saving design for the desk top
- Hi-Speed USB 2.0 Interface
- Store thousands of digital photos, videos, MP3s
- Nero BACKITUP 2 Essentials software included for added security
- Compatible with Windows Vista
- 2 Year Warranty

SAVE $110 off RRP
WebCode: VBM512
$189

Verbatim Micro SDHC 8GB

Memory for your mobile phone

Currently the smallest form factor of memory card available, the Micro SDHC memory cards are designed especially for mobile phones. This tiny memory card consumes very little power, therefore preserving the battery life of your mobile phone.

SAVE $10 off RRP
WebCode: VBM6088
$29

Verbatim Storage Media

DVD-R 25 Spindle	VBM0580	$16
DVD-R 50 Spindle	VBM5101	$23
DVD-R 50 Spindle Inkjet Print	VBM1973	$24
DVD-R 100 Spindle	VBM6049	$44
DVD-R 100 Spindle Inkjet Print	VBM5153	$47
DVD+R 25 Spindle	VBM5033	$16
DVD+R 50 Spindle	VBM5037	$23
DVD+R 50 Spindle Inkjet Print	VBM1974	$25
DVD+R 100 Spindle	VBM6050	$43
DVD+R 100 Spindle Inkjet Print	VBM1995	$47
DVD+R DL 8.5Gb 1Pk J/Case	VBM4912	$4
DVD+R DL 8.5Gb 3Pk J/Case	VBM5014	$12
DVD+R DL 8.5Gb 20 Spindle	VBM4981	$52
BD-R 2x 25GB 5Pk J/Case	VBM4361	$81
BD-R 2x 25GB 10Pk J/Case	VBM6068	$168

Shintaro Slimline Pocket Disks

The Shintaro Slimline Pocket disk has all the features of its smaller predecessors including password protection, rapid transfer speed and resistance to vibration and shocks.

2GB (SHI0039) **$11**
4GB (SHI0040) **$15**
8GB (SHI0041) **$27**
16GB (SHI0042) **$57**
32GB (SHI0043) **$111**

Shintaro Shock Pocket Disks

These little units are splash proof, water resistant and of course shock proof. Never again will your customers have to worry about losing valuable data because of life's little accidents.

2GB (SHI0045) **$16**
4GB (SHI0046) **$24**
8GB (SHI0047) **$41**

Shintaro Slide Pocket Disks

It's elegantly designed sliding mechanism safely retracts the USB connection from sight at the push of a button giving a chic, clean apprearence. This eliminates the need for protective caps, while a 120X transfer speed reads your data up to 12MB per second.

2GB (SHI0049) **$16**
4GB (SHI0050) **$24**
8GB (SHI0051) **$37**

Sandisk Memory Cards

Standard SD
2GB (SAN0030) **$12**
4GB (SAN0115) **$17**
8GB (SAN0116) **$31**

Ultra II SD
2GB (SIM0457) **$14**
4GB (SAN0098) **$21**
8GB (SAN0101) **$44**

Ultra II Compact Flash (CF)
2GB (SIM0691) **$30**
4GB (SAN0023) **$42**
8GB (SAN0037) **$70**

Memory Stick Pro Duo
2GB (SAN0028) **$25**
4GB (SAN0053) **$42**
8GB (SAN0120) **$80**

Ultra II Memory Stick Pro Duo
2GB (SAN0046) **$30**
4GB (SAN0066) **$49**

Extreme III SD
2GB (SAN0112) **$29**
4GB (SAN0125) **$58**
8GB (SAN0126) **$81**

Extreme III Compact Flash
2GB (SAN0106) **$37**
4GB (SAN0107) **$56**
8GB (SAN0108) **$95**
16GB (SAN0165) **$159**

Shintaro 2.5" SATA External Enclosure - Silver

Will house any 2.5" SATA Hard drive

These sturdy units are ideal for storing off site backups, digital photographs or simply adding storage to you PC

- Supports 2.5" SATA or hard drives
- 480Mb/sec transfer rates via USB 2.0
- Easy to install - No jumper pins required

IDE Enclosure
(SHI0052)
$24.95

SAVE $12 off RRP
WebCode: SHI0054
$27.95

Shintaro InkJet Printable CD-R 50 Spindle

SAVE $12 off RRP
WebCode: SHI0036
$14.95

Shintaro InkJet Printable DVD-R 50 Spindle

SAVE $5 off RRP
WebCode: SHI0037
$19.95

SanDisk Cruzer Micro U3 8GB

The market leading flash drive

The Cruzer Micro design is a small, smart and secure USB Flash Drive.

- Small, compact light weight design
- New retractable USB slider eliminates the need for caps
- U3 smart enables you to take your portable applications on the go

2GB (SAN0061) **$26**
4GB (SAN0062) **$35**
16GB (SAN0164) **$74**

SAVE $11 off RRP
WebCode: SAN0103
$38

Tower 7 Port USB 2.0 Hub

Vertical stand included

Running out of USB Ports? Plug this USB Hub into your PC or notebook to increase your capacity.

- Supports both bus and self-powered
- Over-current detection and protection for each down-stream port
- Support O/S: Windows 98SE/ME/2000/XP Vista, MAC OS 8.6 & above

SAVE $39 off RRP
WebCode: SIG0007
$19.95

All in one USB 2.0 Card Reader

SAVE $19 off RRP
WebCode: SIG0008
$9.95

Shintaro Mini Tripod

SAVE $10 off RRP
WebCode: SHI0033
$19.95

Kodak EasyShare M1073IS

Take pictures easily

10.2 Megapixel
3x Optical Zoom
2.7" LCD Screen

SAVE $42 off RRP
WebCode: KOD1073
$157

Canon Powershot A1000IS

Slim, light, easy to use and packed with features

10 Megapixel
4x Optical Zoom
2.5" LCD Screen

SAVE $34 off RRP
WebCode: CAN2022
$215

Canon PowerShot G10

High performance & complete control

14.7 Megapixel
5x Optical Zoom
3.0" LCD Screen

FREE DELIVERY

SAVE $104 off RRP
WebCode: CAN2027
$645

Sony Cyber-shot DSCH10

Carl Zeiss Vario Tessar Lens

8.1 Megapixel
10x Optical Zoom
3.0" LCD Screen

FREE DELIVERY

SAVE $34 off RRP
WebCode: SNY7620
$365

Sony Cybershot DSCW300

Full HD 1080 out put on TV

13.6 Megapixel
3x Optical Zoom
2.7" LCD Screen

FREE DELIVERY

SAVE $188 off RRP
WebCode: SNY7622
$510

Sony CyberShot DSCT500

HD Movie recording

10.1 Megapixel
5x Optical Zoom
3.5" LCD Touch Screen

FREE DELIVERY

SAVE $114 off RRP
WebCode: SNY6924
$585

Nikon Coolpix L16

Simple operation for beautiful photographs

7.1 Megapixel
3x Optical Zoom
2.8" LCD Screen

SAVE $50 off RRP
WebCode: NIK1000
$149

JVC Everio Hybrid Camcorder

Great for home movies

690k Pixels
32x Optical Zoom
60GB Hard Drive

FREE DELIVERY

SAVE $194 off RRP
WebCode: JVC0005
$735

Nikon Coolpix P80

World's smallest 18x Zoom

10.1 Megapixel
18x Optical Zoom
2.7" LCD Screen

FREE DELIVERY

SAVE $119 off RRP
WebCode: NIK1001
$579

JVC HD Everio Camcorder

Output HD Video Quality

1080p Resolution
10x Optical Zoom
40GB Hard Drive

GZ-HD40

FREE DELIVERY

SAVE $524 off RRP
WebCode: JVC0011
$1475

Pinnacle Studio 12

Video Editing Simplified

Everything you need to make home movies. With Pinnacle Studio version 12, making great looking movies has never been easier. Get up and running faster than ever with all new Pinnacle Montage theme based video editing, which features designs by professional producers and artists.

- Easily create stunning movies that you can share on the web, DVD, or portable devices.
- Enhance your videos with photos, music, titles and effects.
- NEW theme-based video editing gets you up and running fast
- Share and archive your creations on DVD, YouTube, iPod, PSP and more.

SAVE $10 off RRP
WebCode: PIN0184
$89

Pinnacle Studio Plus 12

Video Editing Enhanced

Studio's renowned ease-of-use plus complete HD workflow including Blu-ray authoring. Complete with Hollywood style multi-layered effects, animated graphics, titles and Hi-Fi audio.

- Transform your videos and photos into amazing movies
- NEW theme-based video editing gives you creative power
- Capture, edit and burn: The complete native HD solution

Upgrade
(PIN0186) $91

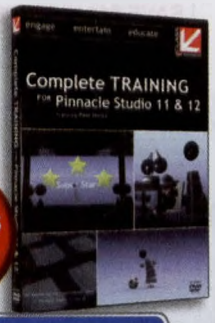
BONUS
Hollywood Effects Valued at $99.95

SAVE 16 off RRP
WebCode: PIN0185
$153

Complete Training for Pinnacle Studio 11 & 12

Get the most out of your pinnacle studio

Complete Training for Pinnacle Studio 11 and 12 covers the new features in Version 11 and 12- HD DVD and AVCHD format editing and HD DVD authoring, Hi-Fi audio music generation, and one-click web publishing.



Bonus Lessons

SAVE $4 off RRP
WebCode: PIN0197
$75

Pinnacle Video Transfer Device

Watch TV shows and movies on your iPod.

One-touch start/stop recording from any video source including a TV, DVD player, PVR, camcorder, set-top box or gaming console.

- S-Video, composite video and stereo audio analog inputs.
- Recharges iPod battery during video transfer
- No PC is required

SAVE $80 off RRP
WebCode: PIN0181
You Pay $209
$159
After $50 Cashback

Pinnacle USB Hybrid Pro TV Tuner

Watch TV on your PC or Notebook.

- Full featured stereo digital and analogue TV plus FM radio
- Hybrid (Analogue & HD DVB-T Digi)
- Includes analogue A/V capture
- Fully compatible with Windows Media Center Includes IR remote control

SAVE $18 off RRP
WebCode: PIN0198
$159

Kaiser Baas Video to DVD Maker – White

Convert your aging VHS video collection straight to DVD

Connect practically any audio/video source, capture, and then burn to DVD. Use the supplied video editing software to create your own amazing movies with effects, transitions, titles and dynamic DVD menus. Burn your movies to DVD, output to iPOD or PSP, or upload direct to YouTube.

- Composite and S-Video input
- Burn directly to DVD using PowerProducer
- One touch snapshot - capture video stills on the fly
- Automatic NTSC / PAL detection
- 2 year Warranty
- Plug & Play USB 2.0 Interface
- MAC or PC compatible
- Publish directly to YouTube using PowerDirector
- Capture analogue Video Source (eg.VHS)

SAVE $15 off RRP
WebCode: KAB0019
$64.95

Logitech Harmony 525 Advanced Universal Remote

SAVE $60 off RRP
WebCode: LOG3594
$69

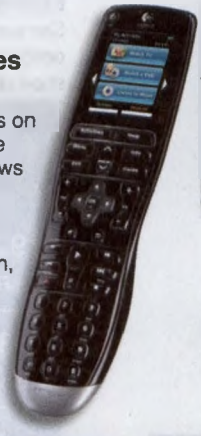
Logitech Harmony 1000i Advanced Universal Remote

SAVE $401 off RRP
WebCode: LOG3601
$398

Logitech Harmony One Advanced Universal Remote

Control up to 15 devices

Logitech knows who you are. You have a half-dozen remotes on the coffee table. And you're the only one in the family who knows how to use them. Logitech can help with the Harmony One Advanced Universal Remote. Enjoy a full colour touch screen, intuitive button layout and an ergonomic design. So easy to use, the whole family will love it.



SAVE $304 off RRP
WebCode: LOG3681
$195

AVLabs USB HD Digital TV Tuner

Watch TV on your computer!

With the AVLabs USB High Definition Digital TV Tuner, you can enjoy watching or recording digital TV on your computer or laptop anywhere, anytime! You can watch and record digital TV with the time-shifting function, you can even pause live TV! With schedule recording you won't miss any of your favourite shows.

SAVE $25 off RRP
WebCode: AVL1013
$39.95

AVLabs FM Transmitter with LCD display

Listen to MP3s through FM Radio

The wireless FM Transmitter connects portable music players to your car or home stereo quickly and easily.

- LCD display
- Supports iPods, MP3 players, MP4 players & more
- 3.5mm jack for audio signal input
- Built-in USB charge port

SAVE $40 off RRP
WebCode: AVL1018
$19.95

Edifier IF330 - Portable iPod Audio System

Impressive sound and sleek industrial design

You love to travel; you love your music, now you can have both. The iF330 iPod speaker system, part of Edifier's IF-Series, combines easy portability, impressive sound and sleek industrial design to offer consumers an affordable audio solution for home or on-the-go. Suitable with other MP3 Players with auxilary input jack.

iPod not included

SAVE $50 off RRP
WebCode: EDI0005
$69

AVLabs Music Studio

Digitize your old vinyls and cassettes to CD or DVD

Do you have old vinyl records and cassettes that haven't been used in years but can't bear to part with? They can now be restored into digital format with the newly released Music Studio from AVLabs. The AVLabs Music Studio records directly from a home stereo to computer, allowing you to save and restore your classic music collections in crystal clear high fidelity.

SAVE $49 off RRP
WebCode: AVL1016
$99.95

1.5" Digital Photo Keychain - Black

Take your memories with you

Store and view up to 143 photos in full colour on a 1.5" digital screen keychain. Built in clock and rechargeable battery. Connect via mini USB for computer upload.

SAVE $10 off RRP
WebCode: OZI0001
$19.95

7" Black Digital Photo Frame

Showcase your memories

Impress your family and friends with a constant slideshow of your latest holiday snaps. You can show up to 4 photos at a time, zoom in and even rotate the image. Compatible with SD, MMC, MS cards and USB Flash Drives.

SAVE $65 off RRP
WebCode: LAS3519
$64.95

Logitech Squeezebox Boom Network Audio Player

Satisfy even the most discriminating ears

The Logitech Squeezebox Boom all-in-one network music player delivers vibrant digital music anywhere in your home. The compact, all-in-one design features an integrated amplifier and speakers. Just plug it in and you're ready to rock the house.

SAVE $310 off RRP
WebCode: LOG3749
$339

Teco 26" HD LCD TV

Perfect for the bedroom

SAVE $749 off RRP
WebCode: TEC9000
$849

Teco 32" HD LCD TV

Built in HD tuner

SAVE $100 off RRP
WebCode: TEC9001
$999

Samsung 50" 6 Series Full HD Plasma

Stunning design, crystal clear image

Experience image quality like you have never seen it before. The latest generation Samsung Panel features 100Hz technology for flicker free viewing, and full high definition resolution for exceptional picture quality. With four HDMI ports you won't be short of connections

SAVE $814 off RRP
WebCode: SAM0091
$2685

Panasonic 37" Full HD LCD TV

A TV that's not to big but not too small

SAVE $474 off RRP
WebCode: PAN0165
$2525

Teco 42" Full HD LCD TV

Fantastic picture at a great price

SAVE $100 off RRP
WebCode: TEC9002
$1599

Mercury AV Cables

Exceptional quality & price

1m HDMI (MER0001) **$34**
3m HDMI (MER0002) **$48**
5m HDMI (MER0003) **$62**
10m HDMI (MER0004) **$96**

5m Component (MER0007) **$59**

10m Component (MER0006) **$89**

Epson EB-S6 Projector

For large images at the office, classroom or home.

SAVE $210 off RRP
WebCode: EMP6000
$789

Sanyo PLVZ700 HD Home Theatre Projector

Enjoy a cinema experience at home.

SAVE $400 off RRP
WebCode: SYO0007
$2899

Microsoft Xbox 360 Arcade Bundle

Take to the skies!

The Xbox 360 Arcade System is everything you need to hit the ground running. Plug in the console and connect the wireless controller and you're playing.

Bundle includes:
- Xbox 360 Console
- Wireless Controller
- Sega Superstars
- Xbox Live Arcade

WebCode: ALL6016 — $298

Nintendo Wii Console + Wii Sports

Fun for all, Young and old

Whether they're young or old, expert gamers or beginners, Wii players will express themselves with intuitive motion control using the Wii Remote: a flick of the wrist to swing a baseball bat or tennis racket, a backswing and follow-through to send a golf ball flying over a pristine fairway.

Includes:
- Vertical Stand
- 1x Wii Remote
- 1x Wii Nunchuck
- 1x Wii Sports Game

SAVE $14 off RRP
WebCode: ALL5085 — $385

Wireless Controller Xbox 360

$72
Save $7 off RRP
WebCode: ALL5058

Xbox 360 Wireless Network Adapter

$137
Save $10 off RRP
WebCode: ALL5034

Lips & Microphone Xbox 360

$87
Save $12 off RRP
WebCode: ALL6015

Dreamgear Wii Soft Sports Kit

$27
Save $2 off RRP
WebCode: DGE0002

Dreamgear Wii Charging Dock

*Wii remotes not included

$35
Save $4 off RRP
WebCode: DGE0003

Nintendo Wii Fit

$139
Save $10 off RRP
WebCode: ALL5604

WebCode: XBX0005

WebCode: XBX0001

WebCode: XBX0004

FOR MORE GAMES
See citysoftware.com.au

WebCode: XBX0002

WebCode: XBX0006

WebCode: XBX0003

$89.95

WebCode: NIN0001

WebCode: ALL6007

WebCode: ALL6013

$74.95

WebCode: ALL6014

WebCode: NIN0003

WebCode: ALL6009

$89.95

Family Tree Maker 2009 Platinum Edition

Learn more about your family.

Everything you'll ever need to trace your ancestors from Australia and beyond is included in Family Tree Maker 2009 – Australian Edition, because it integrates seamlessly with www.ancestry.com.au <http://www.ancestry.com.au/> . Ancestry.com.au is the largest available database of Australian and New Zealand ancestors, and is part of Ancestry.com – the biggest genealogy database in the world. Family Tree Maker is the packed full of resources, so spending hours in the library under the microfiche is a thing of the past, it's all there at your fingertips.

BONUS MATERIAL:

- The Getting Started Guide to Family Tree Maker
- Interactive Training Tutorial
- The Family Tree Maker Little Book of Answers
- Exclusive Offer for Your Family History Magazine
- Bonus DATA DISCS worth over $199

$89 Save $10 Off RRP
WebCode: AVA1012

SmithMicro TuneRanger

Get more control of your iTunes library!

TuneRanger connects iTunes-running computers over any network, allowing you to seamlessly copy music, video, and playlists from one iTunes library to another.

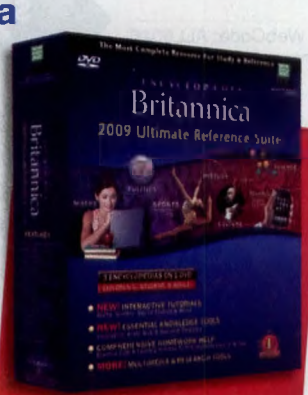
- Great to use where more than one person uses the iTunes library.
- Keep all of your iTunes libraries in-sync with each other
- Works on both Windows and Mac.

$49.95 WebCode: SMI0001

Encyclopedia Britannica Ultimate Reference Suite 2009

3 encyclopedias in 1

- 100,000+ articles, 166,000+ magazine and web links
- **FREE** 1 year subscription to Britannica Online
- **NEW**! Great Minds – 2,000 insightful biographies
- **NEW**! Britannica Workspace – stay organised and efficient
- Multimedia content, atlas, timelines,



$88 Save $11 Off RRP
WebCode: MND1332

$29.95

Ages: 4+

WebCode: IMS0052

Ages: 3 - 5

WebCode: IMS0054

Ages: 4 - 6

WebCode: IMS0056

Ages: 4 - 6

WebCode: MIN5031

Ages: 8 - 12

WebCode: IMS0058

$19.95

WebCode: GSP0013

WebCode: GSP0001

WebCode: MAN0087

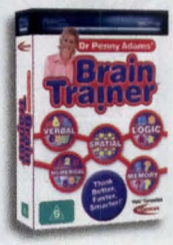
WebCode: IMS0072

Ages: 7 +

WebCode: IMS0045

Ages: 8 Up

WebCode: IMS0065

Ages: 10 Up


WebCode: IMS0048

CorelDRAW Graphics Suite X4

New & Improved

CorelDRAW Graphics Suite X4 lets you tackle creative graphics & design projects with confidence.

- New templates, clipart images, photos & more
- New modernised user interface
- Live text formatting
- Online training with CorelTUTOR
- Advanced image-editing features (including RAW files)

SAVE $330 off RRP
WebCode: COR8968
$499

Corel WinDVD Plus Blu-Ray 9 Windows

Blu-Ray DVD & video playback software

Play spectacular Blu-ray and HD DVD discs on your PC.

- Delivers quality and entertainment in style
- HD-quality upscaling
- Play home movies from AVCHD camcorders

*See citysoftware.com.au/promotions

SAVE $74 off RRP
WebCode: INV0004
$175

Corel DVD MovieFactory Pro 7 Windows

Create movie & slideshow discs

All-in-one HD disc creation and burning software for quickly turning photos and home videos into professional-quality DVD, AVCHD and Blu-ray discs.

- Grab photos & video from anywhere
- Design stunning Hollywood style menus.

SAVE $15 off RRP
WebCode: COR9996
$114

Corel VideoStudio Pro X2 Ultimate

Full HD video editing, complete creative control

Corel VideoStudio Pro X2 Ultimate is a complete digital media solution. Edit standard or high definition video with templates or hands-on creative tools. Share your movies on Blu-ray Disc, DVD or iPhone, or upload directly to YouTube. Edit audio professionally, copy and convert video & watch movies with WinDVD 9 Plus Blu-ray!

SAVE $35 off RRP
WebCode: CRL0012
$214

Corel Paint Shop Pro Photo X2 Ultimate

The easiest way to get professional-looking photos-fast!

Corel Paint Shop Pro Photo X2 Ultimate is loaded with quick-click photo-fixes, custom tools and extras like media recovery software, professionally designed creative content and a 2 GB USB flash drive over $180 in value!

SAVE $30 off RRP
WebCode: COR9203
$169

Nero 9

Simply Create, Rip, Burn, Copy, Share, Backup, Play, and Enjoy

Nero 9 is the next generation of the world's most trusted integrated digital media and home entertainment software suite. It features new cutting-edge functionality that makes enjoying digital media content simple. This easy-to-use yet powerful multimedia suite, gives you the freedom to create, rip, copy, burn, edit, share, and upload online.

SAVE $45 off RRP
WebCode: NER0043
$154

Corel WinZip 12 Pro

Compression, encryption and data backup

- New features and enhancements for photo and image compression, management, and sharing
- Ability to create smaller Zip files and support for additional Archive formats
- Encryption security features to customize password requirements and the types of encryption available

SAVE $15 off RRP
WebCode: COR9209
$84

Reallusion CrazyTalk5 Pro

Turn Photos into Talking Videos

With CrazyTalk5 Pro, you can easily turn a photo into a talking actor. Make your Second Life character talk in the movie, or let your pet deliver the holiday greetings. Send to family and friends, or post it on the web blog, YouTube to share with others.

- Photo Fitting
- Auto Lip-sync
- Face Profile Styles
- Motion Clips
- Real-time Puppetry

SAVE $16 off RRP
WebCode: REA0008
$219

Reallusion FaceFilter Studio 2

Revitalize the Beauty of Your Photo

FaceFilter Studio 2 is the simplest yet powerful photo editor. Take only 5 easy steps and you can achieve the professional results for your family gathering or vacation photos.

- Fine-tune facial expressions naturally
- Smart photo colour correction
- Enhance skin quality
- Select fun expressions & instant photo-stickers
- Import high-res photos up to 12 mega pixels

SAVE $8 off RRP
WebCode: REA0002
$77

Adobe Photoshop Elements 7

Extraordinary photos. Amazing stories.

Combine power and simplicity so you can make ordinary photos extraordinary, tell your stories in personalised creations.

- Make ordinary photos extraordinary with easy-to-use editing tools
- Share your stories in beautiful, personalised creations for print and web
- Easily find and view all your photos

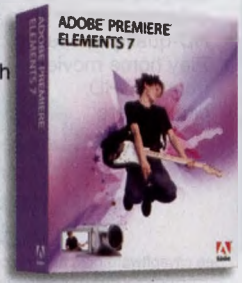
SAVE $23 off RRP
WebCode: ALD0404
$176

Adobe Premiere Elements 7

Easy video editing. Incredible movies.

With Adobe Premiere Elements 7 software, it's easy to make incredible movies. Get started quickly with automated moviemaking options; add knockout visuals & sound; and share your movies everywhere.

- Get started quickly with automated moviemaking options
- Enhance your stories with knockout visuals and sound



SAVE $23 off RRP
WebCode: ALD0406
$176

Adobe Photoshop Lightroom 2

Simplify photography from shoot to finish

Adobe Photoshop Lightroom 2 software is essential for today's digital photography workflow. Now you can quickly import, process, manage, and showcase your images—from one shot to an entire shoot.
Enhanced correction tools, powerful organising features, and flexible printing options help speed you along. With Lightroom 2, you spend less time in front of the computer and more time behind the lens.

- Enhance specific areas of a photo precisely adjust overall colour, exposure, and tonal range.
- Automatically import, rename, and sort your entire shoot.
- Present your work in dynamic slide shows, interactive web galleries, and a variety of flexible print templates.

Academic (AEP9567) $164

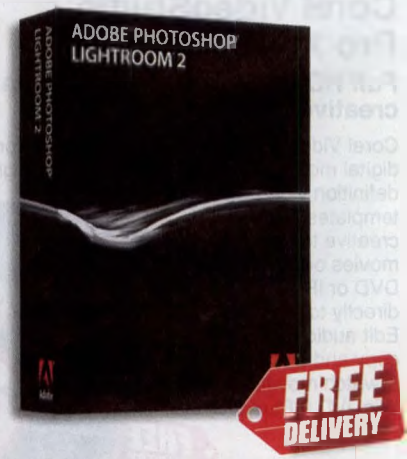
Adobe Photoshop Elements 7 & Adobe Premiere Elements 7

Complete photo and video editing made easy

Adobe Photoshop Elements 7 & Adobe Premiere Elements 7 software combines two powerful yet easy-to-use products at a great value.

- Tell amazing stories with photos and videos.
- Easily create extraordinary photos and incredible movies, and use them together in cinematic slide shows and more.

SAVE $35 off RRP
WebCode:ALD0402
$264



SAVE $72 off RRP
WebCode: ALD9662
$507

QuarkXPress 8

Superior page-layout & design

Inspired by the designer's passion for perfection, QuarkXPress 8 complements the way creative professionals work. Strive to do better and constantly improve – employ page-layout and design software developed to help get you there.

- Design more with fewer clicks using the modern, intuitive interface of QuarkXPress 8
- Build on your existing expertise share your print content across media with built-in Web and Flash authoring tools
- Create stunning text and achieve the effects you want with designer-driven typography
- Work faster and smarter: Design more precisely with enhancements to features you rely on every day.
- Choose among dictionaries and hyphenation in more than 30 languages, open and print a QuarkXPress 8 file created anywhere in the world, or tap into easy-to-use, professional-grade Asian typography

Upgrade (QUA0060) $523
Academic (QUA0061) $185

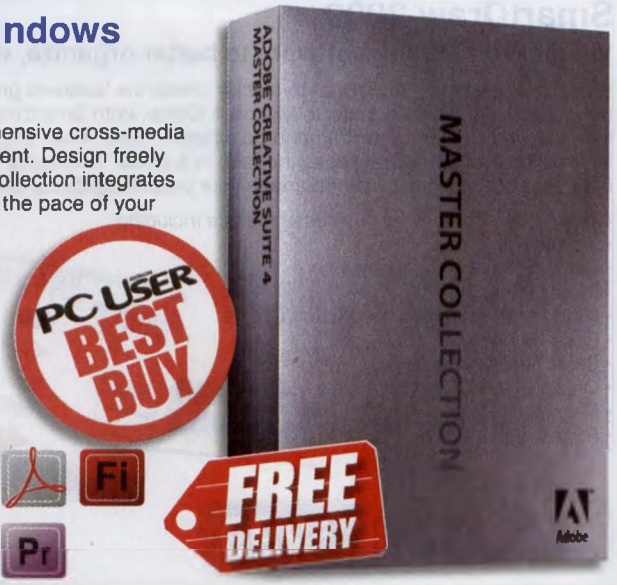
SAVE $240 off RRP
WebCode: QUA0059
$1359

Adobe Creative Suite 4 Master Collection - Windows

Get the tools you need to create content for every design discipline in one product

Leverage the power of Adobe Creative Suite 4 Master Collection software, a comprehensive cross-media creative environment for designing print, interactive, web, film, video, and mobile content. Design freely with images, vectors, video, and sound, moving easily from page to screen. Master Collection integrates new versions of your favourite Adobe software to keep your creative world growing at the pace of your imagination.

- More speed and control in everyday design tasks
- New dimensions in image editing
- Create rich interactive documents
- New animation controls for richer online experiences
- Easier interactions with complex web pages
- Exceptional productivity in video post-production
- Direct-to-disk recording and tapeless workflows
- Project intelligence with XMP metadata
- PDF collaboration



PC USER BEST BUY

FREE DELIVERY

SAVE $844 off RRP
WebCode: ALD1211
$4196

ADOBE CREATIVE SUITE 4

Your shortcut to brilliant is here!

Adobe Creative Suite 4 delivers tightly integrated software and services that measurably improve productivity and enable you to produce richly expressive work in print, web, interactive, video, audio, and mobile.

Adobe Creative Suite 4 Web Premium

A complete solution for creating websites

Tackle websites, applications, user interfaces, and other digital experiences with complete confidence in the power of Adobe Creative Suite 4 Web Premium software. From world-class image editing prowess to sophisticated code-handling capabilities to multiplatform deployment options, Web Premium is the comprehensive solution for the professional web designer and developer.

Includes:
- Dreamweaver CS4
- Flash CS4 Professional
- Photoshop CS4 Extended
- Illustrator CS4
- Fireworks CS4
- Acrobat 9 Pro
- Soundbooth CS4
- Contribute CS4

Student
(ADS0033) **$474**
Academic
(AEP0085) **$837**

FREE DELIVERY

SAVE $63 off RRP
WebCode: ALD1215
$2936

Adobe Creative Suite 4 Production Premium

The perfect AV production package

Master the production challenges of today and tomorrow with Adobe Creative Suite 4 Production Premium software, a tightly integrated pre- and post-production toolset for Windows and Intel based Mac OS systems. Use it for video and audio editing, still and motion graphics, visual effects, and interactive media, as well as DVD, Blu-ray Disc, and mobile authoring.

Includes:
- After Effects CS4
- Premiere Pro CS4
- Photoshop CS4 Extended
- Flash CS4 Professional
- Illustrator CS4
- Soundbooth CS4
- OnLocation CS4

Student
(ADS0031) **$536**
Academic
(AEP0078) **$1078**

FREE DELIVERY

SAVE $63 off RRP
WebCode: ALD1213
$2936

Adobe Creative Suite 4 Design Premium

Produce professional & rich graphics

Adobe Creative Suite 4 Design Premium software is the ultimate toolkit for crafting precise page layouts, creating stunning images and graphics, developing eye-catching web pages and rich interactive experiences, and producing them all with utmost fidelity. Realize the full promise of cross-media design and discover innovative ways to collaborate, all within a single unified creative environment.

Includes:
- InDesign CS4
- Photoshop CS4 Extended
- Illustrator CS4
- Flash CS4 Professional
- Dreamweaver CS4
- Fireworks CS4
- Acrobat 9 Pro

Student
(ADS0025) **$536**
Academic
(AEP0072) **$917**

FREE DELIVERY

SAVE $142 off RRP
WebCode: ALD1207
$3488

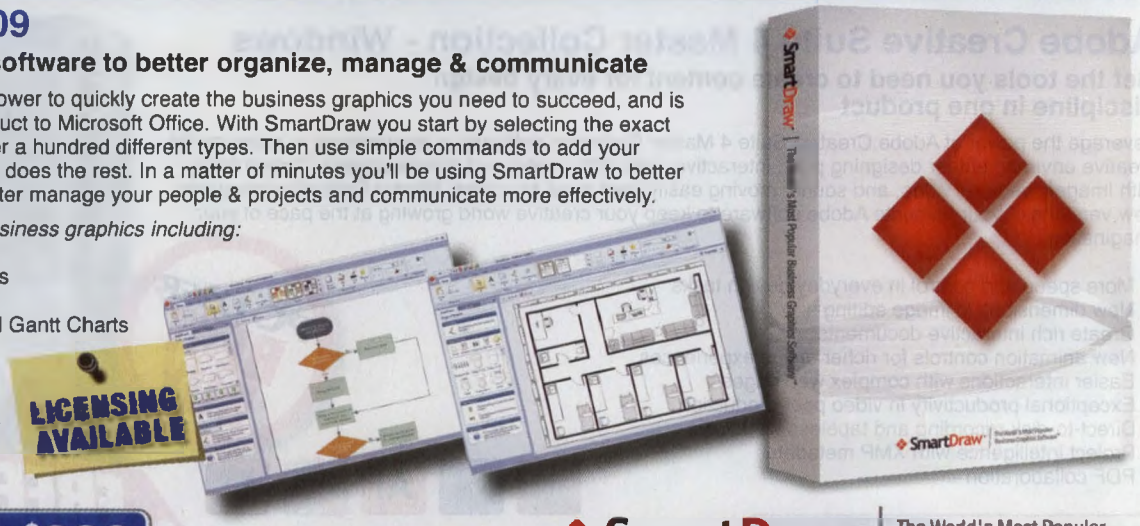
SmartDraw 2009

Visual Productivity software to better organize, manage & communicate

SmartDraw gives you the power to quickly create the business graphics you need to succeed, and is the perfect companion product to Microsoft Office. With SmartDraw you start by selecting the exact template you want from over a hundred different types. Then use simple commands to add your information and SmartDraw does the rest. In a matter of minutes you'll be using SmartDraw to better organize your thoughts, better manage your people & projects and communicate more effectively.

Create clear, compelling business graphics including:

- Flowcharts
- Bar Graphs and Pie Charts
- Project Timelines
- Mind Maps with Integrated Gantt Charts
- Floor Plans
- Sales Territory Maps
- Organisation Charts
- Marketing Strategy Charts
- Forms, and more



SAVE $28 off RRP
WebCode: SMT0071
$299

SmartDraw | The World's Most Popular Business Graphics Software

Autodesk AutoSketch 9

Precision drawing at home

AutoSketch software provides a complete set of CAD tools for creating professional-quality precision drawings.

- Series of tutorials get you up and running fast.
- Microsoft Windows XP like interface

SAVE $36 off RRP
WebCode: AUT0077
$327

IMSI TurboCAD 15 Pro Home & Student

Versatile design package

TurboCAD Pro's complete 2D drafting and 3D surface and solid modeling toolset includes many of the most advanced technologies in the industry. This versatile design package unleashes an outstanding combination of tools for mechanical, architectural and conceptual design and is compatible with over 27 CAD and Graphic file formats.

SAVE $23 off RRP
WebCode: IMS0080
$276

IMSI TurboCAD 15 Deluxe 2D/3D

Ready to read AutoCAD files

- Unlimited design options with hundreds of professional drafting and design tools
- Incredible file support for over 30 file formats including AutoCAD
- Video and interactive tutorials
- Photorealistic rendering and millions of symbols
- Perfect for architects, illustrators, contractors, builders, students, engineers and hobbyists

SAVE $14 off RRP
WebCode: IMS0043
$185

Wacom Bamboo Fun 6x9 Education Single

The ideal pen tablet for students

Wacom's Bamboo Fun (6X9) if a great tool for both students and teachers. Students will enjoy using the pressure sensitive pen for digital art and handwriting recognition, and teachers will also find it useful for marking, annotations and presentations.

Bundled Software:

- Adobe Photoshop Elements Win/ 4 Mac
- Corel Painter Essentials 3
- Ink2 Deluxe

*Student ID required

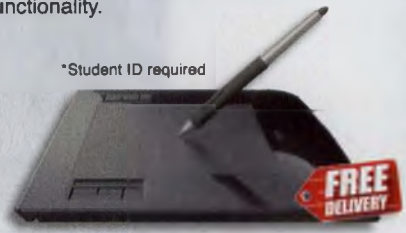
WebCode: WAC9967
$225

Wacom Intuos3 6 x 8 Tablet - Student*

For students at Uni or School

Intuos3 is the industry standard graphics tablet for digital art, animation, image editing and computer graphics. The Intuos3 features ExpressKeys and Touch Strip(s) can substitute all common modifiers and shortcuts, whilst the ergonomic pen delivers professional level functionality.

*Student ID required



SAVE $16 off RRP
WebCode: WAC9983
$333

Wacom Tablet Graphire4 Bluetooth 6x8 (A5) Education

For a classroom of wireless freedom

With the Graphire Bluetooth (6x8), teachers and students have the ability to do pen based drawing, sketching, illustration and powerful presentations when and where they want-without any annoying cabling.

Bundled Software:

- Adobe Photoshop Elements 5
- Corel Painter Essentials 3
- Inspiration 8
- Ink2 Deluxe

*Student ID required

SAVE $46 off RRP
WebCode: WAC0104
$433

AutoCAD 2009

Professional 2D/3D industry standard CAD software

With AutoCAD software Autodesk has just one goal in mind: increasing your productivity. AutoCAD 2009 boosts efficiency with customisable and extensible user interface enhancements that increase overall drafting productivity by decreasing the number of steps to reach a command. Newly designed, innovative features simplify working with layers and help make new users productive as quickly as possible. Easy-to-use navigation tools make finding your way around 3D models a snap. Move to new highs of productivity with AutoCAD software.

Subscription	(AUT0198)	**$716**
Upgrade from 2008	(AUT0189)	**$1599**
Upgrade from 2007	(AUT0190)	**$2491**
Upgrade from 2006	(AUT0191)	**$3378**
Student Edition - 13 Months	(AUT0203)	**$157**

BONUS
Lenovo S10 IdeaPad White

Valued at $799

SAVE $946 off RRP
WebCode: AUT0196
$6094

Autodesk Subscription

Simplify your technology upgrades and boost your design productivity with the complete software, support, and training package from Autodesk Subscription.

Autodesk Subscription is a maintenance program giving you access to Autodesk's latest software releases and enhancements that keep your design tools up-to-date and make the most of your software investment. With software extensions, downloadable e-courses, a single contract number to manage your software, and the option of Autodesk Direct Online Support, you can simplify your software upgrades and minimize disruptions to your workflow.
Get up to date and up to speed now with Autodesk Subscription. All this for a single annual fee when you buy AutoCAD 2009 or AutoCAD LT 2009 software.

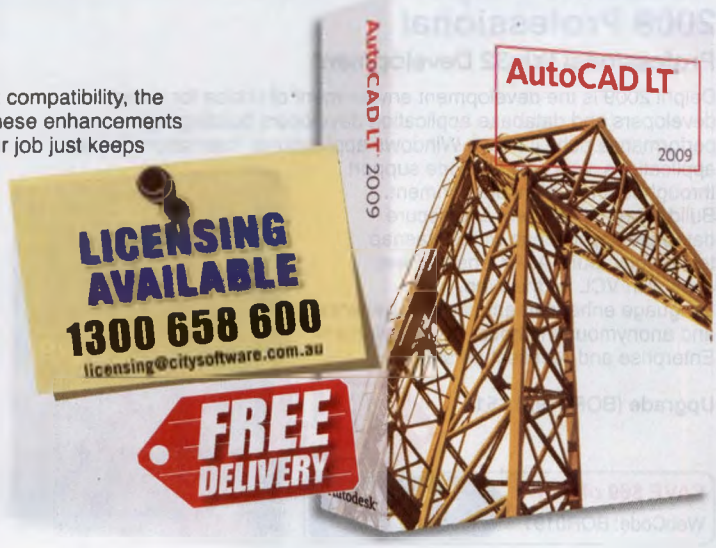
AutoCAD LT 2009

The world's best selling 2D drafting and detailing tool

AutoCAD LT software simplifies daily tasks with full DWG native file format compatibility, the new ribbon interface, menu browser, and enhanced layer dialog. Couple these enhancements with existing features like Dynamic Blocks and annotation scaling, and your job just keeps getting easier.

New features include:
- Ribbon – Easily learn and use with this updated interface
- Quick Properties – View key property information at the entity
- Quick View – thumbnail images of open drawings & layouts

Upgrade (AUT0194) **$1067**
Subscription (AUT0195) **$363**



SAVE $321 off RRP
WebCode: AUT0193
$1859

Visual Studio 2008 Professional Edition with MSDN Subscription

The addition of a MSDN subscription to Visual Studio 2008 Professional ensures that developers have the latest updates to the Visual Studio development environment, have access to the entire Microsoft platform and gain access to technical resources to enable exploration and testing of their solutions with the latest Microsoft platform products. When purchasing under Microsoft's Volume Licensing Programme, Open Business License customers will enjoy a 2 year Subscription compared to only 1 year when purchasing a Retail Boxed Product. Call 1300 658 600 to obtain a quote and discuss your Volume Licensing options.

msdn

Visual Studio 2008 Professional Edition with MSDN Professional Subscription

Customers who attach an MSDN Professional Subscription will enjoy these key benefits:

- Access to current and past versions of Visual Studio
- SQL Server 2008 - all versions (development and test license)
- Microsoft server and client operating systems: Windows Vista, Windows XP, Windows Server 2008, Windows Server 2003 etc. (development and test licenses)
- Technical Support: 2 technical support incidents, managed news group support.

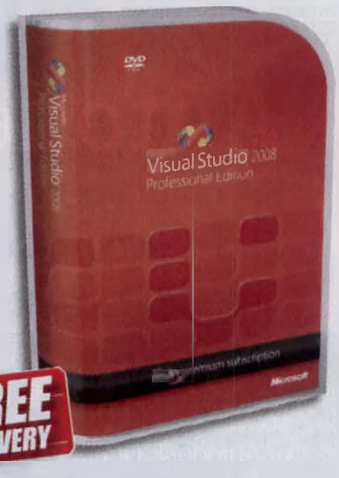
FREE DELIVERY

SAVE $161 off RRP
WebCode: MSA9904
$1923

Visual Studio 2008 Professional Edition with MSDN Premium Subscription

Customers who attach an MSDN Premium Subscription will enjoy these key benefits

- All the benefits of an MSDN Pro Subscription, plus...
- Expression Web 2 and Expression Blend 2 with support for Silverlight 2 development
- Microsoft Office 2007 Ultimate (general business use license)
- A collection of Microsoft application servers (eg BizTalk), business servers (eg. Sharepoint, PerformancePoint), IT Operations Servers (eg Systems Center). (development and test liecnses)
- Microsoft Dynamics Products
- Technical Support: 4 technical support incidents, managed newsgroup support.



FREE DELIVERY

SAVE $338 off RRP
WebCode: MSA9906
$4017

CodeGear Delphi 2009 Professional

Professional Win32 Development

Delphi 2009 is the development environment of choice for software developers and database application developers building high performance rich UI native Windows applications. Internationalise your applications with new Unicode support throughout the Delphi environment. Build powerful, efficient and secure database applications with Datasnap technology. Build AJAX enabled web apps with VCL for the Web. Language enhancements include generics and anonymous methods. Also available in Enterprise and Architect versions

Upgrade (BOR0192) **$518**

FREE DELIVERY

SAVE $69 off RRP
WebCode: BOR0191
$1167

CodeGear C++Builder 2009 Professional

C++ at its best

C++Builder 2009 - the power of the C and C++ languages and libraries with the productivity of RAD development. Enjoy new feature enhancements and productivity improvements to maximise your application development. Added C++0x language enhancements and libraries like TR1 and Boost. Internationalise your applications with new Unicode support throughout the C++ environment. Create great user interfaces with new VCL components. Build AJAX enabled web apps.

Upgrade (BOR0194) **$518**

FREE DELIVERY

SAVE $69 off RRP
WebCode: BOR0193
$1167

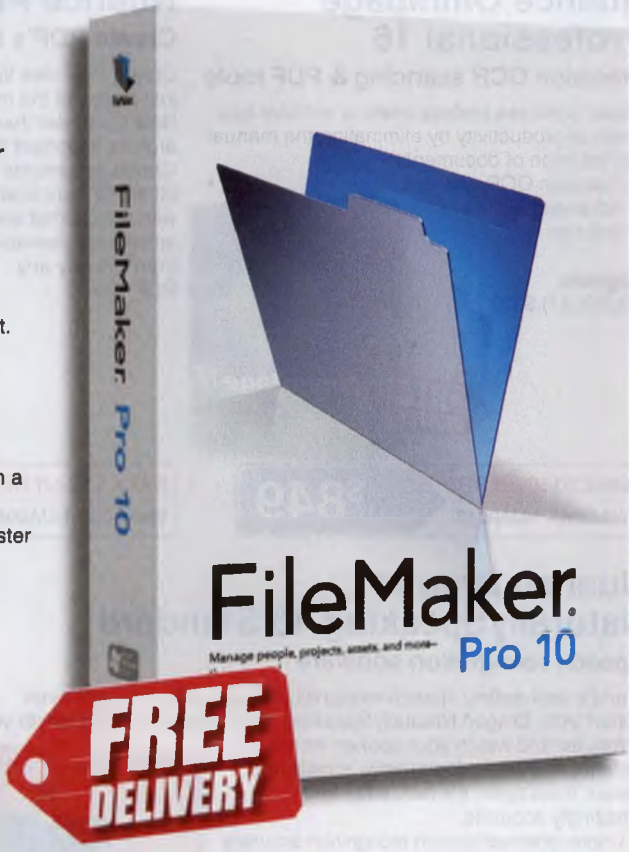
FileMaker Pro 10

Manage People, Projects, Assets, and More

Whether you need to manage client information, track project details, or produce inventory reports, FileMaker Pro 10 helps you get your important information organized in one place so it's instantly accessible.

- **New!** Status Toolbar – Put commonly used features at your fingertips with the redesigned interface. Plus customise the toolbar with features you use the most.
- **New!** Script Triggers - Create and run scripts prompted by user actions for increased productivity.
- **New!** Dynamic Reports - Make changes to grouped data on the fly for easier customisation.
- **New!** Saved Finds - Save your favourite find requests and then perform them in a single click for quicker searches.
- **New!** Send mail via SMTP - Send email directly through an SMTP server for faster direct distribution; no email client needed.
- **New!** Themes and Templates - Choose from 30 updated Starter Solutions and 10 new themes to help build beautiful databases with ease.

Upgrade (FIL2501) **$288**



SAVE $22 off RRP
WebCode: FIL2500
$477

Annual Volume License Agreement (AVLA)

Who should purchase this type of license?

Corporate or government organisations that need at least 10 licenses of FileMaker software. This option provides an easy, flexible way to save time and money on volume licensing.

For more information contact
City Software on 1300 658 600 or email licensing@citysoftware.com.au

ACT! by Sage 2009 v11

#1 Selling Contact Manager

What can ACT! help you do?

- Keep all your important relationship details for quick, organised access to the information you need.
- Get up-to-speed quickly and remain productive because ACT! provides you with an intuitive interface, making it easy to learn and use.
- Find the exact relationship details you need instantly using powerful search capabilities in an easy-to-use format.
- Manage your daily responsibilities by scheduling and tracking activities within ACT! so important calls, meetings, and to-dos are not overlooked.
- Communicate consistently and successfully so you are always top of mind with your prospects and customers.
- Gain instant insight into the performance of your business using dashboards and reports for more informed decision making.
- Easily customize ACT! to fit your unique business requirements and ensure you are capturing the exact data you require.
- Remotely access relationship details, along with your schedule, for the information you need, when and where you need it.

SAVE $45 off RRP
WebCode: ACT0039
$234

Nuance Omnipage Professional 16

Precision OCR scanning & PDF tools

Allows business professionals to achieve new levels of productivity by eliminating the manual reproduction of documents.

- Precision OCR analysis
- Advanced security features

Upgrade
(NUA0047) **$337**

SAVE $150 off RRP
WebCode: NUA0046
$849

Nuance PDF Create 5

Create PDF's the easy way!

Create PDF files from all of your documents with just a click of the mouse, thanks to PDF Create. Now it's easier than ever to share information or archive important files using the PDF format. Create documents up to 3 times faster than with other PDF applications, with results that are universally viewable from virtually any PDF viewer.

SAVE $12 off RRP
WebCode: NUA0062
$57

Nuance PDF Converter Professional 5

Create, convert & edit PDF's fast!

PDF Converter Professional 5, the only complete PDF solution designed specifically for business users, delivers everything you need to create, convert, and edit PDF files.

Academic
(NUA0065) **$137**

SAVE $36 off RRP
WebCode: NUA0064
$159

Nuance Dragon NaturallySpeaking 10 Standard

Speech recognition software

World's best-selling speech recognition software has just got even better! With Dragon NaturallySpeaking 10 Standard you can talk to your computer and watch your spoken words instantly appear in documents, emails and instant messages. It's fast, easy and amazingly accurate.

- Unprecedented speech recognition accuracy
- Create documents, reports & emails faster
- Easier than ever to use
- Works with your favourite programs
- Browse the Internet with ease

Student (NUA0095) **$89**
Academic (NUA0094) **$119**

SAVE $46 off RRP
WebCode: NUA0093
$153

Nuance Dragon NaturallySpeaking 10 Preferred

Works with portable devices

Dragon NaturallySpeaking 10 Preferred gives small business and advanced PC users the power to create documents, reports and emails three times faster than most people type.

- Works with the applications users already have
- Create and edit documents & spreadsheets
- New user interface
- Add custom words and voice commands
- Easy correction and proofing
- New quick voice formatting
- Bluetooth support

Academic
(NUA0092) **$239**

SAVE $40 off RRP
WebCode: NUA0091
$259

DID YOU KNOW?

Nuance DragonNaturally Speaking is 3 times faster than most people type with up to 99% accuracy.

You can also surf the web, Dictate and edit in most windows applications!

Nuance Dragon NaturallySpeaking 10 Preferred Wireless

Great dictation results without the wires

The included Plantronics Calisto Bluetooth headset delivers great dictation results and no wires! Without headset cables, you are no longer tethered to your desk as you create and edit documents, emails and spreadsheets.

- Accurate speech recognition for PC applications
- Create, edit your documents and spreadsheets all by voice
- Send eMail, Instant message and surf the web all by voice
- Dragon voice shortcuts to perform tasks faster than ever

SAVE $40 off RRP
WebCode: NUA0105
$459

Nuance Dragon NaturallySpeaking 10 Professional

Ideal for business professionals

The ideal solution for busy corporate professionals to create documents and emails, fill out forms, and streamline workflow tasks — all by speakin

- Dragon Voice Shortcuts for Web Search
- Dragon Voice Shortcuts for Desktop Search
- Dragon Voice Shortcuts for Email and Calendar
- Productivity for Mobile Workers
- Network Ready

Academic
(NUA0098) **$1137**

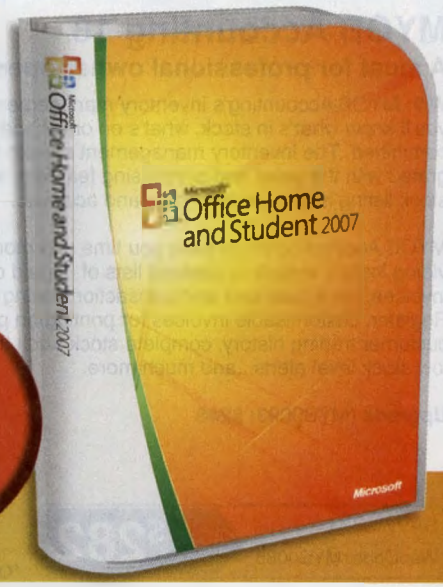
SAVE $126 off RRP
WebCode: NUA0097
$1273

Microsoft Office Home & Student 2007

Great for families, great for students

Office Home and Student 2007 is the software suite that helps people easily create great-looking documents, worksheets and presentations, as well as manage notes and information at home. It offers improved menus and tools, enhanced graphics and formatting capabilities, new time management tools, and greater reliability and security.

Word 2007 Excel 2007 PowerPoint 2007 OneNote 2007



3 User

SAVE $81 off RRP
WebCode: MSA6101
$128

Microsoft Office

Microsoft Office Small Business 2007 - Upgrade

New tools in Office Small Business 2007 help you work faster

Create more professional documents, spreadsheets, and presentations.

- Find what you need faster and more easily by using Instant Search.
- New graphics capabilities make it easier to produce professional documents, spreadsheets &presentations that are publication-ready.
- Schedule tasks in Microsoft Office Outlook 2007 that will appear on your calendar.

Word 2007
Excel 2007
Powerpoint 2007
Publisher 2007
Outlook 2007 with Business Contact Manager

FREE DELIVERY

SAVE $51 off RRP
WebCode: MSA6106
$398

Microsoft Office Small Business 2007

Powerful and easy-to-use productivity and contact management suite

Offers new tools to help employees at small businesses work more efficiently and effectively so they can deliver better customer service. People will be able to organize all their customer and prospect information in one place, as well as develop more professional presentations, marketing materials and campaigns in-house.

Word 2007
Excel 2007
Powerpoint 2007
Publisher 2007
Outlook 2007 with Business Contact Manager

FREE DELIVERY

SAVE $65 off RRP
WebCode: MSA6105
$684

Microsoft Windows Vista Home Premium SP1 Academic Upgrade

Windows Media Center included

Windows Vista Home Premium is the preferred edition for home desktop and mobile PCs. It provides a breakthrough design that brings your world into sharper focus while delivering the productivity, entertainment, and security you need from your PC at home or on the go.

Full (MSA5118) **$327**

Full Upgrade (MSA5119) **$187**

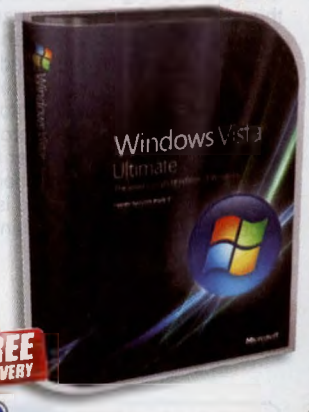
SAVE $20 off RRP
WebCode: MSA5120
$119

Microsoft Windows Vista Ultimate SP1

Unleash the full potential of your PC

Windows Vista Ultimate is the most comprehensive edition of Windows Vista. It is the first operating system that combines all of the advanced infrastructure features of a business. Inherits features of both Home Premium and Business editions of Windows Vista.

Upgrade (MSA5124) **$380**



FREE DELIVERY

SAVE $17 off RRP
WebCode: MSA5123
$432

MYOB Accounting 18

A must for professional owner-operators

With MYOB Accounting's inventory management system you'll know what's in stock, what's on order and what's committed. The inventory management system is integrated with the sales and purchasing features, so your stock listing is always up to date and accurate.

MYOB Accounting helps save you time and money by providing instant access to detailed lists of unpaid customer invoices, bank balances and transactions using the Bank Register, customisable invoices for printing on plain paper, customer trading history, complete stock audit trails and low stock level alerts...and much more.

Upgrade (MYB0093) $246

BONUS Norton Internet Security 2009 full version DVD.

FREE DELIVERY

*Offer available via redemption

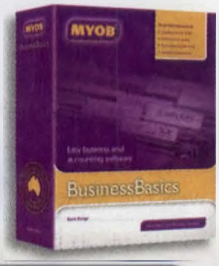
SAVE $67 off RRP
WebCode: MYB0086
$282

MYOB BusinessBasics

Ideal for sole traders

Manage all your basic business tasks from the one easy program, designed specifically for small or home-based Australian businesses. Streamline the data entry and reconciliation side of managing your business with MYOB BusinessBasics, and free up your time to focus on running it. MYOB BusinessBasics is ideal if you:

- Run a small or home based business
- Employ no staff
- Have no inventory



SAVE $23 off RRP
WebCode: MYB0004
$146

MYOB Accounting Plus 18

Integrated payroll & time billing

With an award-winning integrated payroll, MYOB Accounting Plus is the ideal single-user business management and accounting solution for small employers. MYOB Accounting Plus makes it easy to track and charge for your time and manage your inventory, and provides easy access to powerful profit-building information about your business.

It also:

- Automates your PAYG Runs
- Calculates payg withholdings
- Works out your superannuation and then updates all your accounts automatically

Upgrade (MYB0094) $342

BONUS Norton Internet Security 2009 full version DVD.

FREE DELIVERY

*Offer available via redemption

SAVE $151 off RRP
WebCode: MYB0087
$488

MYOB RetailReady

Point of sale in a box

MYOB RetailReady contains all the software and hardware you need to turn your PC into an effective Point of Sale (POS) solution. RetailReady processes sales fast, reports GST and performs "Cash Ups" in just a few clicks. Includes:

- MYOB Retail Basics
- Barcode Scanner
- Thermal Docket Printer
- Electronic Cash Drawer

SAVE $127 off RRP
WebCode: MYB0040
$872

MYOB Premier 12 - 3 User

Ideal for small to medium business

MYOB Premier gives you the power to manage even the most complex medium-sized business. Get the complete set of business management features as found in MYOB Accounting Plus and also handle transactions and accounts in multiple currencies. Multiple people can access your business information at the same time, which can help make your processing more efficient. For example, someone can enter a sale while someone else prints a report or enters a cheque - think of the time you'll save! MYOB Premier is also issued with one full year of access to software support and upgrades.

BONUS Norton Internet Security 2009 full version DVD & a Verbatim 500GB External Hard Drive USB 2.0.

FREE DELIVERY

*Offer available via redemption

SAVE $154 off RRP
WebCode: MYB0089
$1341

MYOB RetailManager v10

Advanced retail POS software

Our retail software is designed, developed and tested in close collaboration with existing retail businesses.

- Process sales fast, including lay-bys and accounts
- Manage your inventory
- Identify where you're making money
- Comprehensively manage pricing

BONUS Norton Internet Security 2009 full version DVD & a Verbatim 500GB External Hard Drive USB 2.0.

*Offer available via redemption

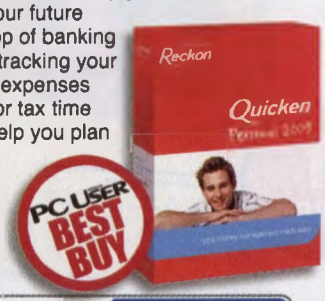
SAVE $440 off RRP
WebCode: MYB0082
$1595

Quicken Personal 2009

Manage your personal finances better

Designed for individuals that want to actively participate in the management of their personal finances & plan for the future.

- Budgeting tools to help you save and plan for your future
- Stay on top of banking & bills by tracking your income & expenses
- Prepare for tax time
- Tools to help you plan for future



SAVE $9 off RRP
WebCode: QUI0168
$86

Quicken Personal Plus 2009

Manage your investments

Provides tools to help you manage your finances, plan for the future & maximise tax-saving opportunities

- Budgeting tools to help you save and plan for your future
- Monitor all of your personal and business investments
- Track your income, expenses, bank accounts and credit cards

BONUS:
One Year Subscription to Money Magazine valued at $55

Offer available via redemption see citysoftware.com.au

SAVE $30 off RRP
WebCode: QUI0169
$159

Quicken Home & Business 2009

A complete financial overview

Combine investing & cashflow management for both personal and business.

- Create cash based tax reports including BAS statements
- Be informed of your financial position
- Manage your investment Professional business tools includeds

BONUS:
One Year Subscription to Money Magazine valued at $55

Offer available via redemption see citysoftware.com.au

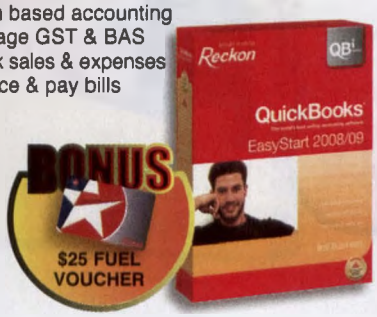
SAVE $51 off RRP
WebCode: QUI0170
$398

QuickBooks EasyStart 2008/09

Designed for first time users

Simple and practical tools make it easy to manage all essential business tasks.

- Cash based accounting
- Manage GST & BAS
- Track sales & expenses
- Invoice & pay bills



Offer available via redemption see citysoftware.com.au

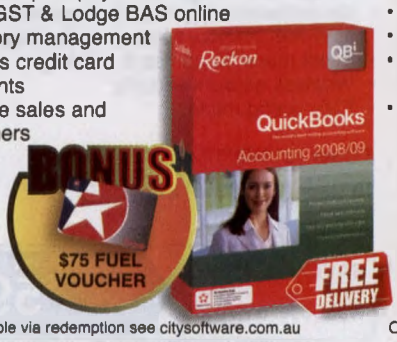
SAVE $16 off RRP
WebCode: QUI0150
$123

QuickBooks Accounting 2008/09

Designed for small businesses

Specifically designed for small businesses that don't require payroll.

- Track GST & Lodge BAS online
- Inventory management
- Process credit card payments
- Manage sales and customers



Offer available via redemption see citysoftware.com.au

SAVE $42 off RRP
WebCode: QUI0151
$257

QuickBooks Plus 2008/09

Track inventory & payroll

Time saving features and functionality for any efficient minded business.

- Integrated payroll
- Produce business reports
- Process credit card payments
- Manage sales and customers

Offer available via redemption see citysoftware.com.au

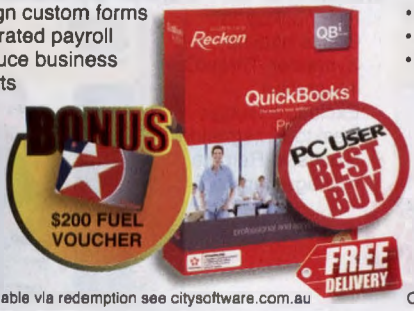
SAVE $81 off RRP
WebCode: QUI0152
$498

QuickBooks Pro 2008/09

Time billing & job costing built-in

Prepare quotes & estimates, and analyse key projects using the included advanced tools.

- Integrate with Microsoft Office
- Design custom forms
- Integrated payroll
- Produce business reports



Offer available via redemption see citysoftware.com.au

SAVE $118 off RRP
WebCode: QUI0153
$731

QuickBooks Premier 2008/09

3 User access

Designed to meet specific industry needs, multi user capability to help increase your business efficiency.

- Time billing & job costing
- Multi-user access
- Integrate with Microsoft Office

Offer available via redemption see citysoftware.com.au

SAVE $221 off RRP
WebCode: QUI0154
$1178

Reckon Retail Starter Kit 2008/09

The all-in-one POS & accounting solution

If you are opening your store for the first time, or upgrading from a cash register, then Reckon's Retail Starter Kit is what you need.

- QuickBooks Plus 2008/09 QBi Series
- Retail Point of Sale Lite 2008/09 Thermal Printer, Scanner & Cash Drawer

SAVE $151 off RRP
WebCode: QUI0162
$848

Backup Exec 12.5 for Windows Small Business Server

Backup & Recovery protection

Symantec Backup Exec 12.5 delivers market leading backup and recovery protection from server to desktop, providing complete data protection for the latest Windows Server 2008 environments and support for VMware and Microsoft virtual systems.

Product highlights:

- **New** Agent for VMware Virtual Infrastructure efficiently detects virtual systems & provides comprehensive data protection for unlimited VMware guest machines. Efficiently restores individual files or an entire image from a single backup
- **New** Agent for Microsoft Virtual Servers - protects unlimited guest systems running Microsoft Hyper-V or Virtual Server and provides efficient recovery of virtual files or an entire virtual server image from a single backup.
- **New** integrated data protection for Windows Essential Business Server 2008 - easily manage Backup Exec job configurations & monitoring through a single Essential Business Server administrative console.
- **Enhanced** Agent for SharePoint Servers - Added flexibility to restore SharePoint documents, sites & list items through Granular Recovery Technology.
- **New** SQL 2008 support - Point-in-time recovery & integrated support for file stream and SQL database compression.
- **New** Remote Media Server Agent for Linux Servers – Redirection of Linux and Oracle data to attached tape and disk storage resources to optimize and improve backup performance for Linux environments.
- **Enhanced** NDMP Option - Backup flexibility for NDMP-enabled NAS devices to the Backup Exec media server includes shared storage environments

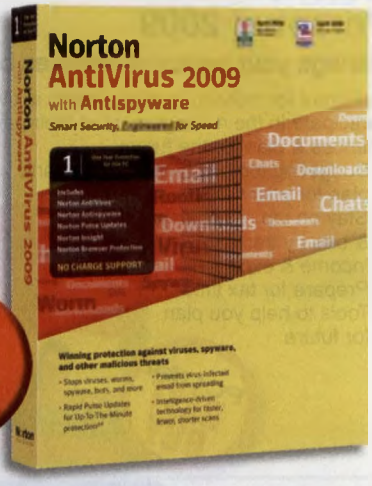
To download a FREE 60 day trial visit:
www.symantec.com.au/citysoftware-be

Norton AntiVirus 2009

Efficient antivirus solution

- Re-engineered for speed
- Smarter for faster, fewer, shorter scans
- Up-to-the-minute protection against spyware, viruses, worms, bots and other threats.
- Easy install in < 1 minute, uses < 10MB of memory.
- Silent mode for games & movies
- FREE phone and online help

3 User (SYM9952) **$76**
5 User (SYM9953) **$90**
10 User (SYM9954) **$169**



1 User

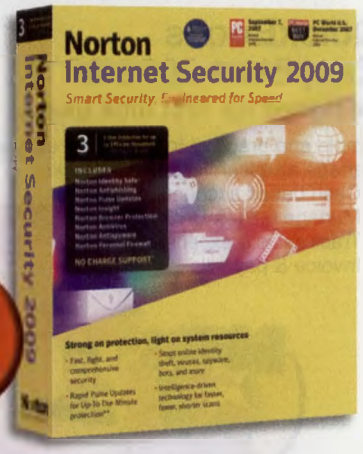
SAVE $6 off RRP
WebCode: SYM9951
$43

Norton Internet Security 2009

Faster than ever before

- Re-engineered for speed
- Rapid install averaging < 1 minute, uses < 10MB of memory.
- Unique technology for faster, fewer scans
- Up-to-the-minute protection against identity theft, spyware, viruses, spam, bots, keyloggers & new threats
- Silent mode for games & movies
- Wireless network security
- Fully configurable

5 User (SYM9957) **$127**
10 User (SYM9958) **$210**



3 User

SAVE $40 off RRP
WebCode: SYM9956
You Pay $79
$59
After $20 Cashback

Norton 360 2.0 All-In-One Security 3 User

Fast PC & internet security in a box!

- Easy security, backup and tuneup for up to 3 PCs
- Award-winning antivirus, antispyware and firewall protection
- Stronger protection as you shop & bank online
- New wireless network security features
- Flexible backup options now include HD-DVD, Blu-ray Disc, iPod
- 2GB of secure online storage also included

5 User (SYM9927) **$162**
10 User (SYM9928) **$288**

2GB Online storage

PC USER BEST BUY

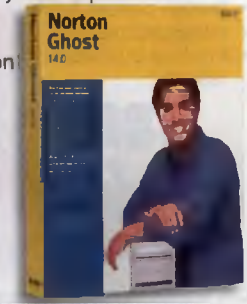
SAVE $60 off RRP
WebCode: SYM9925
You Pay $109
$69
After $40 Cashback

Norton Ghost 14.0

It's back and better than ever

Norton Ghost 14.0 backs up and restores a user's entire PC computer system, including all of its data - applications, settings, folders and files - and offers exclusive remote backup management, industry-leading encryption and advanced compression features to ensure everything on the PC system is protected.

- FTP backup
- Offsite backup
- Symantec ThreatCon integration
- Exclusive Google Desktop integration
- Exclusive Remote management tool



SAVE $20 off RRP
WebCode: SYM9911
$79

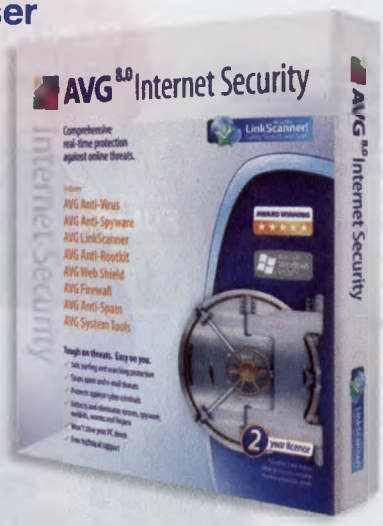
AVG Internet Security 8.0 - 3 User

The Ultimate Security Solution

Anti-Virus, Anti-Spyware, Anti-Spam, Firewall and LinkScanner. Identifies and stops threats before they become a problem.

- Real-time protection against all Internet threats
- Real-time security while you surf, search and chat online
- Stops junk e-mail and spam based identity theft attacks
- Top-quality protection that won't slow your system down
- Free local telephone support, plus e-mail support around the clock

1 User (AVG0006) **$69**
5 Users (AVG0007) **$145**
10 Users (AVG0008) **$250**



SAVE $4 off RRP
WebCode: AVG0009
$78

AVG Anti-Virus Network Edition 8.0 - 5 PCs

Centrally Controlled Anti-Virus Protection

- Protection for workstations and file servers
- Remote administration of all computers on the network
- Centralised installation and configuration with full statistical reporting
- Free local technical support, plus e-mail support around the clock

10 PCs (AVG0012) **$380**
20 PCs (AVG0013) **$660**

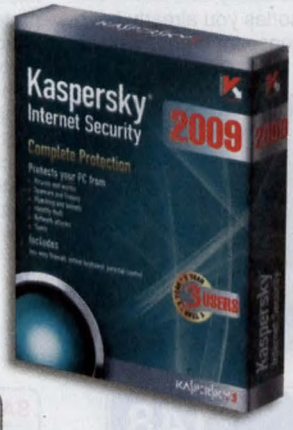
*Image for illustration purposes only

SAVE $5 off RRP
WebCode: AVG0011
$199

Kaspersky Internet Security 2009 - 3 User

Proven Anti-Virus Protection

Kaspersky Internet Security 8 provides you with the same proven anti-virus protection as Kaspersky Anti-Virus together with additional features including Parental Control, a personal firewall, an anti-spam filter, Privacy Control and more.



SAVE $15 off RRP
WebCode: KAS0004
$84

BullGuard Internet Security Suite 8.5 - 3 User

Includes BullGuard Backup + 5GB online storage

Daily updates, super fast scan times, small footprint, firewall, anti-spam, anti-phishing, antispyware.

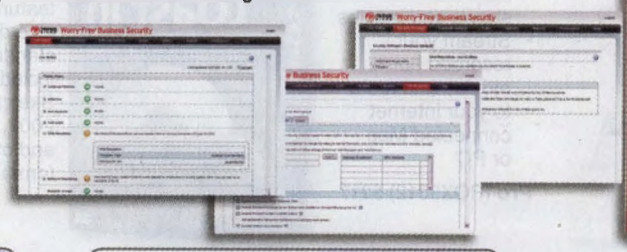
- Backup includes FREE 5GB online storage, backup while idle, integrates with internet explorer.
- Access your files and data from anyway online. FREE 24 x 7 support with instant chat and remote assistance built all within the program!

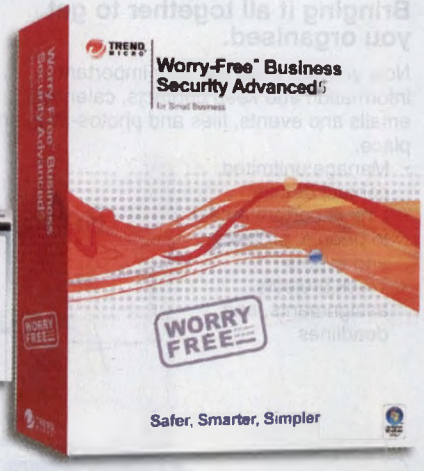
SAVE $19 off RRP
WebCode: BUL0009
$79

Trend Micro Worry Free Business Security Advanced - 5 Node

Protect your small business and its reputation against data theft, risky websites, and overwhelming spam

Our safer, smarter, simpler security blocks web-based threats and other malware to protect your business assets and customer information. Only Trend Micro offers web threat protection that addresses the exponential growth of web threats with constant updates that won't slow your PCs down. Our knowledge base rapidly deploys to defend all our customers like a global neighbourhood watch. Worry-Free Business Security Advanced includes InterScan Messaging Hosted Security to block spam before it reaches your network and protects Microsoft Exchange and Small Business Servers, Microsoft Windows servers, PCs, and laptops.





5 Node
WebCode: TRM9002
$569

10 Node
WebCode: TRM9003
$1139

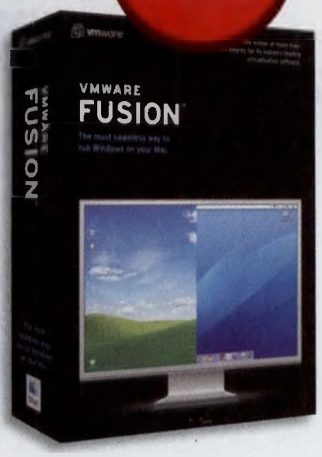
VMware Fusion 2

Windows is even better on the Mac

Seamlessly run your favorite Windows applications and devices, on any Intel-based Mac. Built from the ground up for the Mac, VMware Fusion is the easiest way to switch to Mac—letting you bring all of your Windows applications with you, making the most of your Windows software investment, while providing the perfect safety blanket for the switch.

VMware Fusion is backed by nearly a decade of proven, high-performance virtualisation technology. As the winner of more than 100 awards for its industry-leading virtualisation software, VMware is trusted by millions of users worldwide. Put the power of VMware on your Mac today by purchasing VMware Fusion

BONUS* Encyclopedia Britannica



*Via redemption

WebCode: SMI0002 $129

FileMaker Pro 10 Upgrade

Finally, an easy-to-use database software for small businesses!

Combining both power and simplicity, FileMaker Pro 9 gives you the tools you need to connect to the world of data! The award-winning ease of use that is built into every aspect of FileMaker Pro continues to be praised by millions of customers and industry experts around the world. With its easy installation and setup, you'll be up and running in a matter of minutes not hours or days.

FREE DELIVERY

SAVE $25 off RRP WebCode: FIL2501 $274

Parallels Desktop 4.0

Run Windows on your Mac without rebooting

Get complete, instant access to all of your programs, files and folders across Windows and Mac OS X in a single, seamless experience

SAVE $14 off RRP WebCode: PAR0007 $125

Apple Mac OS X Leopard

300+ new features

Mac OS X v10.5 Leopard is packed with over 300 new features, installs easily, and works with the software and accessories you already have. Choose a single-user license for home or office. Alternatively if you have more than one Mac at home, choose the 5 user Family Pack.

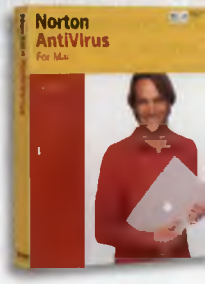
5 User (APP0349) $236

SAVE $10 off RRP WebCode: APP0350 $148

Norton AntiVirus 11.0

#1 AntiVirus software for Mac

It removes viruses automatically, cleans infected Internet and email downloads, and protects against advanced online threats and attacks that target newly discovered operating system and application vulnerabilities. Use the enhanced, all new dashboard widget to quickly check your system's virus protection status. Compatible with new Mac OS X v10.5.



SAVE $14 off RRP WebCode: SYM9799 $51

Bento 2

Bringing it all together to get you organised.

Now you can organise your important information and keep contacts, calendars, emails and events, files and photos-all in one place.

- Manage unlimited contact details
- Link important emails to people, projects and events
- Track projects, assignments, and deadlines

WebCode: FIL2098 $79

Roxio Toast 10 Titanium

Leading Mac burning suite

Compress, convert and compile videos as well as capture audio from any source. Burn discs on the Mac with a host of improved features such as:

- Import and create HD projects
- Burn HD TiVo TV shows and movies
- Stream your recorded home movies and more to your internet connected Mac or PC

Pro (ROX5012) $217

SAVE $27 off RRP WebCode: ROX5011 $152

Punch! ViaCAD 2D/3D

Leader in CAD software for Mac

In ViaCAD, 3D designs automatically create 2D details, plans and elevations with a single mouse click. It creates section and detail views bill of materials lists, and includes complete 3D editing tools, annotation, and dimensions, among many other practical features. The software also delivers industry standard interoperability including Google SketchUp, AutoCAD 2007, Adobe Illustrator and other common 3D formats.

SAVE $11 off RRP WebCode: PUN0027 $138

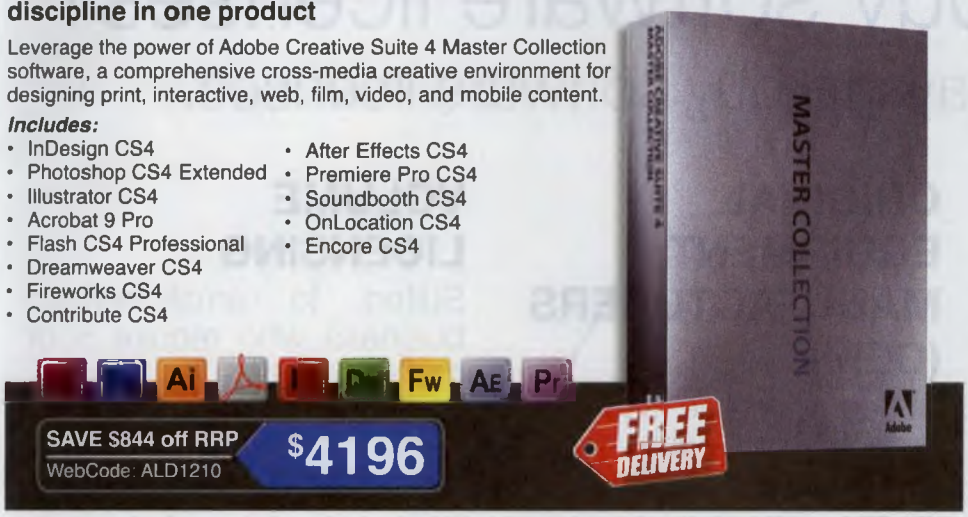
Adobe Creative Suite 4 Master Collection Mac

Get the tools you need to create content for every design discipline in one product

Leverage the power of Adobe Creative Suite 4 Master Collection software, a comprehensive cross-media creative environment for designing print, interactive, web, film, video, and mobile content.

Includes:

- InDesign CS4
- Photoshop CS4 Extended
- Illustrator CS4
- Acrobat 9 Pro
- Flash CS4 Professional
- Dreamweaver CS4
- Fireworks CS4
- Contribute CS4
- After Effects CS4
- Premiere Pro CS4
- Soundbooth CS4
- OnLocation CS4
- Encore CS4



SAVE $844 off RRP
WebCode: ALD1210
$4196

It's a simple equation.

BIG SAVINGS on Office Mac 2008 when you buy any Mac*.

You already know how much 2008 Office for Mac can simplify your life at school and at work. Now, with these great savings, the financial equation just got simpler, too.

Get new versions of Word, Excel, PowerPoint and Entourage that make it easier than ever to create dynamic presentations, professional-looking reports and engaging projects. And with hundreds of new customizable templates and suite-wide themes, you can give all your work a fresh new look.

Achieve more with the power of the reinvented Office for Mac. Now, for less.

SAVE $40 off RRP
WebCode: MSA3770
$189

Office:mac 2008

MYOB AccountEdge

Easy to use payroll and time billing software

MYOB AccountEdge is easy to use business, payroll and time billing software, designed specifically for a Mac. With AccountEdge you can capture more business information, automate more of your processes and have greater control over your cash flow.

- Streamline pay runs
- Bill for your time the way you want to
- Adjust your inventory as you buy and sell items
- Manage your contacts and interactions

SAVE $67 off RRP
WebCode: MYB0091
$572

Accounting

MYOB AccountEdge	MYB0091	$572
MYOB FirstEdge	MYB0090	$146

Database Tools

FileMaker Pro 10	FIL2500	$477
FileMaker Pro 10 5-User	FIL2505	$1914
FileMaker Pro 10 5-User Upg	FIL2507	$1134
FileMaker Pro 10 Academic	FIL2502	$294
FileMaker Pro 10 AE 5-pack	FIL2506	$1182
FileMaker Pro 10 Adv AE	FIL2304	$478
FileMaker Pro 10 Advanced	FIL2503	$756
FileMaker Pro 10 Adv Upg	FIL2504	$473
FileMaker Pro 10 Upgrade	FIL2501	$288

Design Tools

Corel Painter X	COR8700	$478
Corel Painter X Academic	COR8702	$176
Corel Painter X Upgrade	COR8701	$429
Enfocus PitStop Pro 7.2	ENF0003	$1210
QuarkXPress 8	QUA0059	$1359

Education

Britannica 2009 Ref Suite	MND1332	$97

Graphic Suites - Academic Editions

Adobe CS4 Design Premium	AEP0071	$1090
Adobe CS4 Design Standard	AEP0074	$768
Adobe CS4 Master Collection	AEP0075	$1812
Adobe CS4 Production Premium	AEP0077	$1091
Adobe CS4 Web Standard	AEP0086	$728

Multimedia

I-Studio for iPOD	MAN0104	$28

Photo Editing (Adobe)

Photoshop CS4 Ext Aca	AEP0107	$548
Photoshop Lightroom 2	ALD9662	$507
Photoshop Lightroom 2 Upg	ALG9582	$185
Photoshop Lightroom 2 Edu	AEP9567	$164

Productivity (Adobe)

Acrobat 9 Professional	ALD9651	$551
Acrobat 9 Pro Upgrade (Pro)	ALG9565	$246

System Tools

Alsoft DiskWarrior 4.00	ALS0003	$130
Alsoft DiskWarrior 4.00 Upg	ALS0009	$88

Web/Internet

Adobe Dreamweaver CS4	ALD1220	$779
Adobe Fireworks CS4	ALD1222	$586
Mr Sites - Internet In a Box	MRS0001	$99

How do I buy software licenses?

Three popular ways to buy software licenses.

FULL PACKAGED PRODUCT (FPP)

Suited for home use and for small businesses that need less than 5 licenses.

Full Packaged Product (FPP) is software that you buy off the shelf in store or from buying through our online store. Each box contains a copy of the software that you install on your computer and one or more licenses. This option is ideal for the home user and small businesses that need less than five software licenses.

ORIGINAL EQUIPMENT MANUFACTURERS (OEM)

Suited to home users and organisations with minimal hardware requirements.

With OEM you will receive the software already installed when you buy the hardware (such as a laptop). The software licenses are attached and owned by the computer as opposed to FPP which is owned by the purchaser. That means the software cannot be transferred to another computer. This option is suited to home users and organisations with minimal hardware requirements.

VOLUME LICENSING

Suited to small/medium business who require 5 or more licenses.

A software license acquired through Volume Licensing is a simple and cost-effective way to purchase multiple licenses under a single agreement. Volume Licensing offers volume discounts and provides an effective way for you to add the latest products and upgrades to your business. This is best suited to businesses that plan to grow their business over time helping to provide a seamless IT management and procurement process. Licenses can be transferred from one computer to another, and organisations with as few as 5 PCs will benefit from this option.

Benefits of Volume Licensing

SAVE MONEY

The equation with volume licensing is very simple – the more you buy, the more you save. Businesses are sometimes confused trying to understand the different ways that volume licensing discounts are applied. This is where City Software and CSW-IT serve Australia best. For over 16 years City Software has served Australian businesses' software needs with excellence making City Software one of Australia's widely recognised licensing experts on over 50 licensing programs.

Businesses can also save money by standardising software and purchasing software maintenance or support programs such as Software Assurance and Upgrade Protection. When purchasing these additional programs you may also benefit from receiving free training, support services and home use rights whilst receiving the biggest benefit of all ... access to new upgrades that arise during your active agreement term.

SAVE TIME

When compared to FPP, purchasing volume licensing is less time consuming. Rather than having to make multiple purchases you can consolidate all your purchases into one software licensing agreement. Adding users also takes no time at all. Simply purchase extra licenses and make the installations with the media kit you already have.

AVOID RISK

With City Software & CSW-IT's assistance we will ensure that you are legally compliant with the software manufacturer's agreements. We also track your purchases, becoming your Software License Watchdog, reducing the risk of you over-purchasing – a common trap for small/medium businesses.

It's as easy as 1-2-3

1 FIND A SOLUTION

We assist you in selecting the best suited software for your business. Contact one of our licensing consultants on 1300 658 600 or via email at licensing@citysoftware.com.au

2 REQUEST A QUOTE

We will prepare a quote for you that is sure to be unbeatable. In most cases a quote will be prepared for you by the end of the day.

3 RECEIVE LICENSES

An email will be sent containing the license keys. Expected times may vary from product to product due to vendor licensing processing time. If physical media has also been ordered this will be despatched by courier in a timely manner.

Volume Licensing Partners

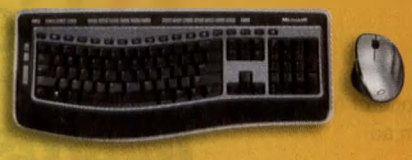
Adobe
Microsoft
NUANCE
roxio
KASPERSKY lab
nero
TREND MICRO
Business Objects an SAP company
Autodesk
symantec.
COREL
Quark Authorized Reseller
AVG
SmartDraw

Microsoft

Microsoft Wireless Laser Desktop 6000

Desktop comfort and style with portable mouse convenience

Flip 3D — Experience this dynamic Windows Vista feature by pressing a key or the mouse scroll wheel to display a 3D overlay of all open windows, and cycle through them.



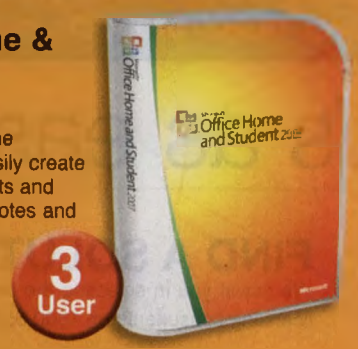
SAVE $28 off RRP
WebCode: MST8490
$121

Microsoft Office Home & Student 2007

Essential software for everyone

Office Home and Student 2007 is the software suite that helps people easily create great looking documents, worksheets and presentations, as well as manage notes and information at home.

- Word 2007
- Excel 2007
- PowerPoint 2007
- OneNote 2007



SAVE $81 off RRP
WebCode: MSA6101
$128

Microsoft LifeCam VX-3000

Video call your family and friends

Microsoft LifeCam VX-3000 is a wired, desktop webcam that delivers High Definition still (1.3 megapixels interpolated) photography, brilliant video (640x480 pixels) and a built-in unidirectional noise-canceling microphone for crystal-clear audio performance.

SAVE $21 off RRP
WebCode: MST8426
$113

It's a simple equation.

BIG SAVINGS on Office Mac 2008 when you buy any Mac*.

Office:mac 2008

You already know how much 2008 Office for Mac can simplify your life at school and at work. Now, with these great savings, the financial equation just got simpler, too.

Get new versions of Word, Excel, PowerPoint and Entourage that make it easier than ever to create dynamic presentations, professional-looking reports and engaging projects. And with hundreds of new customizable templates and suite-wide themes, you can give all your work a fresh new look.

Achieve more with the power of the reinvented Office for Mac. Now, for less.

SAVE $40 off RRP
WebCode: MSA3770
$189

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citysoftware.com.au

Microsoft VOLUME LICENSING

A software license acquired through Microsoft Volume Licensing is a simple and cost-effective way to purchase multiple licenses under a single agreement. It offers volume discounts and flexible payments plans, and provides an effective way for you to add the latest Microsoft products and upgrades to your business. Licenses can be transferred from one computer to another, and organisations with as few as 5 PCs can benefit from this option. There are two types of Volume Licenses available for business with fewer than 250 computers: Open Business and Open Value.

OPEN BUSINESS

Open Business is a single agreement offering a 2-year term and upfront payments. It's designed for businesses that don't want to purchase large volumes of software but would prefer to pay for software licenses, as they need them.

OPEN VALUE

Open Value is a single agreement that offers a 3-year term and allows you to spread your payments over the term of the agreement. Open Value also provides options for you to acquire additional services, tools, support and training to help you maximise your support assessment.

Contact our sales team on 1300 658 600 to obtain a quote

SOFTWARE ASSURANCE BENEFITS CONTRIBUTE TO:

- Return on your technology Investment
- Providing better budget predictability
- Minimised downtime
- Improved Productivity
- Lower operating expenses associated with employee development, deployment & support costs.

Gaming with Pioneer DreamBook® from BIG W

Pioneer DreamBook® IL4 $699

- VIA 1.6Ghz Processor
- 10.2" LCD Screen
- 1GB RAM
- 160GB Hard Drive
- 802.11 b/g Wireless
- 1.3M Camera
- Microsoft Windows XP Home
- 6 Cell Long Life Battery
- Carry Slip Case
- 3 Colours: Black, White, Pink

With Bonus of over $250

Games Preloaded

- Microsoft Age of Empires ($59 RRP)
- Microsoft Zoo Tycoon ($59 RRP)
- Microsoft Maths ($59 RRP)

Office Ready Preloaded

- Microsoft Works 9.0 ($79 RRP)
- Microsoft Office 2007 Pro 60 days trial
- Microsoft One Care 90 days trial
- **ALL SOFTWARE PRELOADED ON DREAMBOOK**

Claim a $350 (50%) Education Tax Refund for your kids *

Giving your kids access to the latest technology is easy with the Government's new annual Education Tax Refund. Eligible families are able to claim a 50% refundable tax offset on education expenses on Pioneer DreamBook IL4. Take advantage of the new Family Tax Benefits and claim up to $375 per child for primary school students and up to $750 per child for high school students. Make the most of this tax year – buy a Pioneer DreamBook, keep your receipts, and claim your tax refund!

* Eligibility for those entitled to Family Tax Benefit Part A. To find out if your family is eligible for the Education Tax refund visit www.treasury.gov.au

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live big for less

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Computers Australia
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www.bigw.com.au

www.pioneer.net.au

EPSON
EXCEED YOUR VISION

small footprint
small business
heavyweight performers
now with a light touch

Epson Stylus Photo TX800FW

Buy Genuine Get Rewards

www.epsongenuinerewards.com.au

The Epson Stylus™ Office printer range is a design innovation for the small office. It has everything – the latest **light touch-screen LCD display**, up to 40ppm, (the fastest inkjet printer in its class*), auto-document feeder, fax, WiFi, LAN and optional auto-duplexing. Productivity is increased with a choice of high capacity ink cartridges, and you only replace the cartridge you use. What's more, you can choose an office model with DURABrite™ Ultra for durability or Claria for high definition prints. These small, stylish, heavyweight performers will carry all your office needs!

For further information please call **1300 361 054.**
*See **www.epson.com.au** for details.

Epson Stylus Office TX600FW

Epson Stylus Office TX300F

Epson Stylus Office T40W

Epson Stylus Office T30